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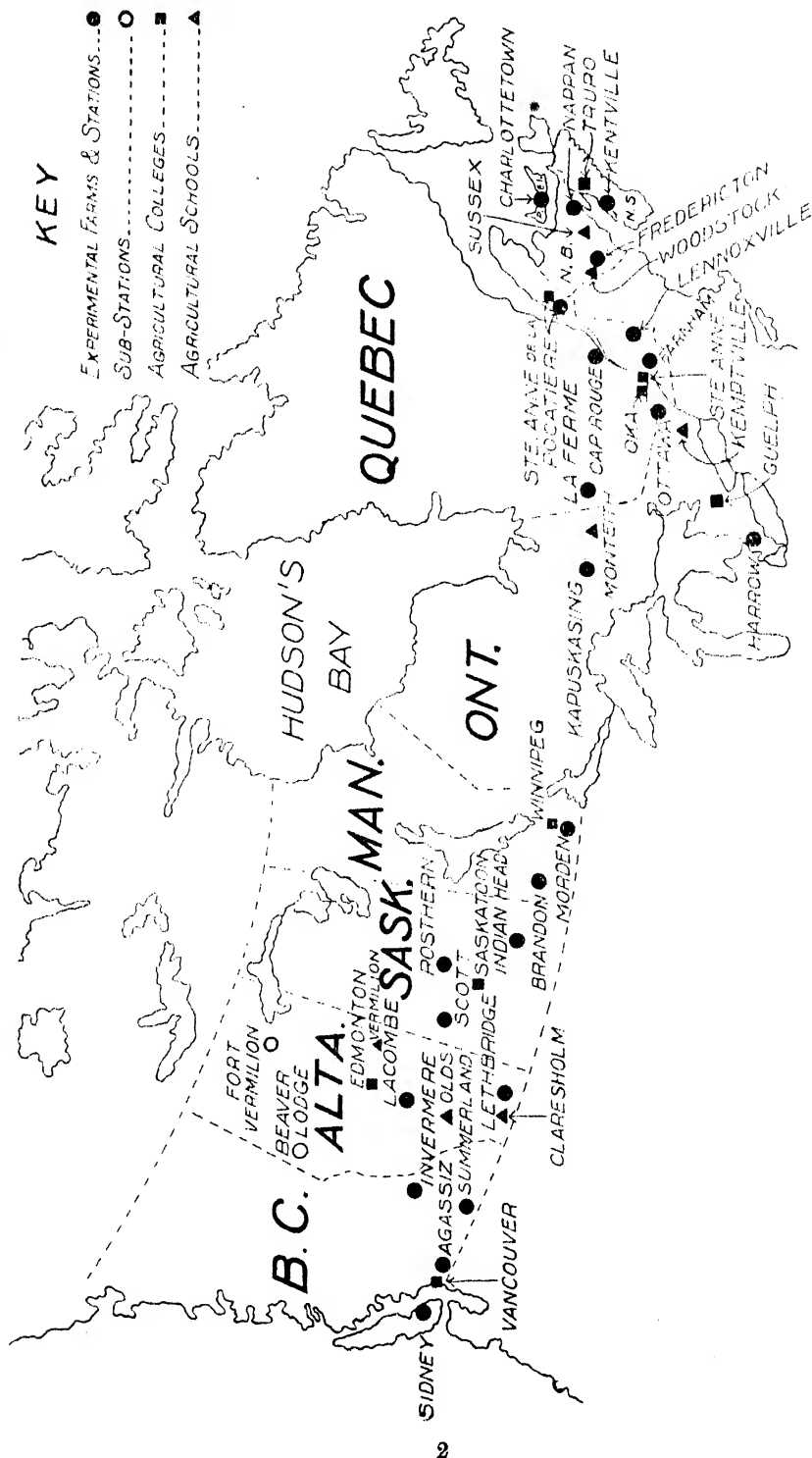
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The AGRICULTURAL GAZETTE

OF CANADA

Issued by the Dominion Department
of Agriculture, Ottawa



MAP OF CANADA SHOWING THE LOCATIONS OF FARMS, STATIONS AND SUB-STATIONS IN THE EXPERIMENTAL FARMS SYSTEM, THE AGRICULTURAL COLLEGES AND AGRICULTURAL SCHOOLS

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Subscriptions should be forwarded to the Editor, Agricultural Gazette, Ottawa.

J. B. SPENCER, B.S.A., Director of Publicity.

ANNOUNCEMENT

WITH the current issue, *The Agricultural Gazette* enters upon the eighth year of its career as the organ of the Dominion Department of Agriculture and as the medium for keeping officials throughout Canada informed as to agricultural progress and development.

The decision has been reached to issue the *Gazette* as a bi-monthly instead of a monthly publication, as heretofore. It is believed that this change can be made without detriment to the usefulness of the journal. The *Gazette* will continue to be the exponent of the policies and activities of departments of government charged with the regulation of agricultural affairs and with the advancement of agricultural training and education. It will continue to function as the medium for giving publicity to departmental effort, so as to assist workers by keeping them informed as to methods and results, thereby aiding them to systematize and simplify their work and to avoid duplication.

The *Gazette* solicits a continuation of that co-operation and assistance of workers in agriculture and agricultural education which hitherto has been so liberally accorded.

GOVERNMENTAL ASSISTANCE TO THE AGRICULTURAL INDUSTRY

THE FARM is Canada's most important national asset. As the basic industry underlying the material prosperity of the country, its well-being and advancement are matters of national concern. The expenditure for the promotion of agriculture benefits, not merely those directly engaged in farming, but every other section of the community. Governments are therefore justified in

making liberal provision for financing the undertakings of departments charged with its direction and supervision.

The total appropriation placed at the disposal of the federal and provincial Departments of Agriculture for the fiscal year 1920-21, approximates the sum of ten million dollars, as denoted by the following table:—

Department of Agriculture of Canada.....	\$ 5,020,000
"The Agricultural Instruction Act"—Federal.....	1,100,000
Prince Edward Island, 1919-20.....	20,170
Nova Scotia.....	111,450
New Brunswick.....	118,181
Quebec.....	899,500
Ontario.....	1,594,540
Manitoba.....	582,490
Saskatchewan.....	282,014
Alberta.....	538,100
British Columbia.....	375,736
	<hr/>
	\$ 10,642,181

In this number of *The Agricultural Gazette* will be found in concise form an outline of the organization of the several departments of agriculture, federal and provincial, and a summary of the various activities carried on with a view to the advancement of the farming industry.

The Dominion Department of Agriculture was created in 1868. As originally constituted, it had but little to do with agriculture, and it was not until 1887, when the Experimental Farms system was instituted, that it began the work for which it was established.

The functions of the federal department are largely those of regulation, protection, promotion, and experiment

and investigation. No clear demarcation exists as to the spheres of action of Dominion and provincial departments, except as regards the control of educational affairs, which is definitely assigned to the provinces. Such institutions as colleges of agriculture and special agricultural schools have grown up under provincial jurisdiction. The provinces, guided by this principle, have likewise developed the machinery necessary for the carrying on of extension work in its broader aspects. This includes the conveying to the man on the farm by various means the facts essential to the successful prosecution of his calling. It was one of the principal objects of the Agricultural Instruction Act to assist provinces in conducting this form of work.

Extension work does not, however, belong exclusively to the provinces. It is obviously associated with all forms of propaganda for the stimulation of any branch of the industry, particularly in regard to its commercial aspects. Work in the extension field forms an important phase of federal activities, carried on, however, in close co-operation with the provinces. Thus the regulation of the marketing of farm products, and instruction in the preparation of those products, go hand in hand. In the field of experiment, investigation and research the Dominion department is primarily responsible, and it is the recognition of this fact that led to the extension in recent years of the Experimental Farms system to all parts of Canada.

PART I

Dominion Department of Agriculture

ORGANIZATION AND SCOPE OF THE DOMINION DEPARTMENT OF AGRICULTURE

THE following is a statement in summarized form of the organization of the Department of Agriculture for Canada and of the work performed by the department.

The Department of Agriculture is divided into a number of branches, each of which takes charge of certain activities or administers certain legislation pertaining to one particular line of agricultural industry. The branches of the department are as follows:—

Administrative Branch,
Experimental Farms Branch,
Health of Animals Branch,
Live Stock Branch,
Dairy and Cold Storage Branch,
Seed Branch,
Entomological Branch,
Fruit Branch,
International Institute of Agriculture,
Publications Branch,
Agricultural Instruction Act Branch.

The various lines of effort of each branch are given in a very brief manner below.

ADMINISTRATIVE BRANCH

The Administrative Branch, as its name implies, has to do with the administration of the whole Department of Agriculture. The major divisions are—the Minister's office, the Deputy Minister's office, the Accountant's office, where all financial matters in connection with the department are attended to, and the office of the Translator. The translator's office is responsible for the translation into French of all departmental publications, which are usually written in the

English language, and also for the writing of French correspondence for the Administrative Branch when necessary.

EXPERIMENTAL FARMS BRANCH

This branch is the largest of all the branches of the Federal Department of Agriculture, and is the one which probably comes more closely in touch with the farmers of the country than do any of the others. The Experimental Farms system covers a wide field, and gives its service to a wide territory, as the branch Experimental Farms are scattered all over the country, from the Atlantic to the Pacific and from the international boundary line to the Yukon. The centre of the Experimental Farms system is the Central Experimental Farm at Ottawa, and there are 20 branch experimental farms and stations at present in operation, located at the following points:—

Charlottetown, P.E.I.,
Kentville, N.S.,
Nappan, N.S.,
Fredericton, N.B.,
Ste. Anne de la Pocatière, Que.,
Cap Rouge, Que.,
Lennoxville, Que.,
LaFerme, Que.,
Kapuskasing, Ont.,
Morden, Man.,
Brandon, Man.,
Indian Head, Sask.,
Rosthern, Sask.,
Scott, Sask.,
Lethbridge, Alta.,
Lacombe, Alta.,
Summerland, B.C.,
Agassiz, B.C.,
Invermere, B.C.,
Sidney, B.C.

Besides the Experimental Farms proper, a number of Experimental Sub-stations are located in the thinly settled districts of northern Alberta and the Northwest Territories where experimental work on a smaller scale is carried on. These Sub-stations are located at Beaverlodge, Alta., Fort Vermilion, Alta., Swede Creek, Y.T., Dawson, Y.T., Salmon Arm, B.C., while experimental work is also carried on for the Experimental Farms Branch at some of the settlements in the Northwest Territories, namely, Fort Smith, Fort Resolution and Fort Providence.

Connected with the Experimental Farms system are two Tobacco Stations, at Farnham, Que., and Harrow, Ont. These Stations are located in a country which has proved itself suitable for tobacco production, and their chief line of operation is in connection with tobacco production.

In order to bring the work of the Experimental Farms more closely to the attention of farmers in some of the newer provinces, as well as the older ones, a system of Illustration Stations has now been established. Some 80 of these stations have been established in the provinces of Alberta, Saskatchewan, Quebec, New Brunswick, and Nova Scotia, and their influence has already been felt in the country surrounding them.

As stated above, the work of the Experimental Farms system is directed from Ottawa, where the work is divided into the following sub-divisions, each under the charge of a Chief.—

**Horticulture,
Cereals,
Animal Husbandry,
Field Husbandry,
Chemistry,
Poultry,
Forage Plants,
Botany,
Bees,
Tobacco,
Illustration Stations,
Fibre,
Extension and Publicity.**

As is indicated by its name, the Experimental Farms Branch is mainly occupied in conducting experimental and research work in connection with agriculture along the various lines indicated by the names of the divisions mentioned in the preceding paragraph. These lines cover practically all the field of practical agriculture, and while each farm perhaps does not carry on work in all these lines, an attempt is made to make each Experimental Farm of maximum benefit to the district which it serves.

The results obtained from experimental work carried on on the Farms are given to the public through the media of press articles, publications, lectures and addresses, exhibits at agricultural fairs, as well as by direct illustration and demonstration on the Experimental Farms themselves, and on the Illustration Stations, which endeavour to illustrate the methods that have been found to be most suitable on the Experimental Farms proper.

In addition to the experimental work, this branch also has charge of the administration of that section of the Destructive Insect and Pest Act which deals with plant diseases. For the past few years potato inspection has been carried on, and a great deal of investigation into black-rust of wheat and white pine blister rust. Plant pathological laboratories have been established at Charlottetown, P.E.I., Fredericton, N.B., St. Catharines, Ont., Winnipeg, Man., Brandon, Man., Indian Head, Sask., and Saskatoon, Sask., as well as the central laboratory at Ottawa, and these laboratories serve as centres for the work of the administration of this Act, as well as for research work into plant diseases.

HEALTH OF ANIMALS BRANCH

The activities of this branch take, in general, the direction of maintaining the health of the live stock population of this country at the highest possible standard, of safe-guarding the consumers by insuring a supply of wholesome

and properly inspected meat, meat products and canned goods, and of research work in animal diseases.

The Health of Animals Branch is divided into three divisions, viz.:—

Animal Contagious Diseases Division, which administers the Animal Contagious Diseases Act;

Meat and Canned Foods Division, which administers the Meat and Canned Foods Act;

Pathological Division, which conducts research work into diseases of live stock.

A large staff of veterinary inspectors is maintained by the Animal Contagious Diseases Division at ports of entry, as well as other inland points in this country. Their duties consist of the inspection of animals entering Canada, and placing such animals in quarantine if found necessary. There are 85 quarantine stations located at various ports. These inspectors also investigate and enforce control measures for outbreaks of contagious diseases of live stock as they occur. A great deal of work has been done during the past few years towards the suppression of Hog Cholera, and under the present regulations garbage feeders are licensed and their premises periodically inspected, and quarantined if any trace of disease is found. The Animal Contagious Diseases Act also provides for the superintending of the disinfecting and cleaning of stockyards and railway cars used in the transportation of live stock. Regulations have also been put into operation whereby municipalities may obtain inspection for dairy cattle producing milk for sale in that municipality, and last year a commencement was made towards putting into operation the Accredited Herd System which has proven so successful in the United States. Under this system, owners of pure-bred herds can obtain inspection for tuberculosis, and when their herds have been proved to be free from that disease they are placed on the Accredited List and enjoy certain privileges as to

export to the United States without further inspection.

The Meat and Canned Foods Division also maintains a large staff of veterinary inspectors and lay inspectors, whose duty it is to examine animals before they are slaughtered in the abattoirs, and also examine the meat and meat products from these animals before they can be offered for sale for human consumption. These veterinary inspectors are stationed at all the large packing plants throughout the country, and this division also inspects all meat and meat products coming into inspected plants from foreign countries. Another phase of its work is the supervision and inspection of canning factories, jam factories, evaporated milk factories and condensed milk plants doing business in Canada; the testing and reporting on samples of imported and domestic canned fruits and vegetables as well as milk, while just recently new regulations provide for the approval of this Division being obtained as to labels used on canned fruits, vegetables and milk manufactured and offered for sale in this country.

The Pathological Division maintains a Biological Laboratory at Ottawa, a Research Station at Hull, Que., and field laboratories at Agassiz, B.C., and Lethbridge, Alta. At these laboratories supplies of mallein, tuberculin and blackleg vaccine are prepared and tested and these are sold to applicants at cost. A great deal of research work has already been carried on, and is continually being carried on with various live stock diseases such as dourine, contagious abortion, chicken diseases, bracken poisoning, while one officer of this division is stationed at Charlottetown, P.E.I., where he is conducting an investigation in connection with the nutrition of black foxes.

LIVE STOCK BRANCH

The activities of this branch are in general directed towards the improvement and development of the live stock

industry by the encouragement of the production of better live stock, and by improving marketing facilities. This work, while carried on under direction from Ottawa, is performed mainly in the producing and marketing districts where officers are stationed to help the producer and the shipper.

This branch also administers the Live Stock and Live Stock Products Act.

The chief divisions of this branch are:—

**Horse Division,
Cattle Division,
Sheep and Goat Division,
Markets Division,
Poultry Division.**

The Horse Division administers the policy with reference to Federal aid to horse-breeding associations. Up to a few years ago the department owned a number of pure-bred stallions which were loaned for breeding purposes to farmers' organizations throughout the country. This policy has in the past few years been considerably modified, and the department's holdings of stallions materially decreased. Under the present policy the department pays a grant to farmers' associations using a stallion that has been approved by the inspectors of the Horse Division. This division also makes arrangements for providing live stock judges for agricultural fairs which have received the Government grant, and investigates and gives advice upon transportation matters as affecting live stock.

The Cattle Division administers the policy with respect to the breeding of better beef and dairy cattle. Pure-bred bulls are loaned to farmers' organizations and dairy cows are tested for record of performance.

This division also has charge of the administration of the Free Freight and Car Lot Policies which give assistance to farmers and others in taking back from marketing centres animals brought there for slaughter but which are found

by our officers to be suitable for breeding or finishing purposes.

The Sheep and Goat Division loans pure-bred rams and boars to farmers' associations under the Distribution Policy, and also supervises the grading of wool and the encouragement of its co-operative marketing by farmers' organizations. A financial grant is made by this division to farmers using pure-bred rams for the first time, while attention is also given to the organization of ram clubs and sheep-breeding centres. A report is sent out each week dealing with the wool market, and exhibition material in connection with the sheep, goat and swine industries is prepared and shown during the season.

The Poultry Division administers the Live Stock and Live Products Act as it refers to eggs, and provides for the inspection of eggs offered for export. This division also encourages the co-operative marketing of eggs and poultry, publishes a daily and weekly egg and poultry market report, and gives advice on the transportation, packing and marketing of eggs and poultry. A record of performance for poultry has recently been inaugurated, and inspectors have been appointed to carry on the necessary work in connection therewith.

The Markets Division administers the Live Stock and Live Stock Products Act as it refers to stockyards and live stock exchanges. The part of this division located in Ottawa had largely to do with the preparation and publishing of daily, weekly and monthly market reports dealing with the marketing of live stock. Stockyard agents are stationed in the stockyards at Edmonton, Calgary, Prince Albert, Winnipeg, Toronto and Montreal to obtain marketing information, and assist farmers and live stock shippers. These officers also assist the Cattle Division in the operation of the Free Freight and Car Lot Policies.

Under the Live Stock and Live Stock Products Act the department passes upon the by-laws, constitutions, etc., of

live stock exchanges operating in stock-yards under their supervision.

DAIRY AND COLD STORAGE BRANCH

The Dairy and Cold Storage Branch, as its name implies, has to do with the dairy industry of this country, and also in a small measure with cold storage warehouses. It administers the Dairy Industry Act, the Oleomargarine Act, and the Cold Storage Act.

The chief divisions are the Dairy and Cold Storage Division and the Markets Division.

The Dairy and Cold Storage Division operates a Dairy Station at Finch, Ont., and a Pre-cooling Cold Storage Warehouse at Grimsby, Ont. Experiments and investigations into the manufacture of butter and cheese are carried on, and during the past year a Dominion Educational Butter Scoring Contest has been in operation, involving the inspection and rating of samples of butter from all over the country. In order to encourage the farmer to keep only the best producing cows, officers of this division organize and carry on cow-resting work in the various provinces, while last year a commencement was made in the grading of butter offered for export at the port of Montreal. Under the Cold Storage Warehouse Act, the department pays a certain subsidy towards the erection of cold storage warehouses used for public cold storage, and the work in connection with the payment of these subsidies is under the control of this division. Investigations are carried on in connection with the shipment of fruits, dairy products, eggs, etc., in refrigerator cars.

The Markets Division arranges for refrigerator car service for butter and cheese shipments operated by railways under agreement with the department. Its cargo inspectors also inspect and supervise the loading at Canadian and the unloading at British ports of all shipments of perishable products. Thermographs are placed in all vessels

carrying such products and the records so obtained are blue-printed and distributed to shippers.

A weekly dairy produce market report and monthly news letter are published by this division, which also inspects butter under the Dairy Industry Act, and administers the Oleomargarine Act.

SEED BRANCH

The Seed Branch works along the lines of the encouragement of the use of better and purer seed, and the production of good seed. During the war years it also had charge of the work of insuring a proper supply of good seed for districts in Canada where there was an apparent shortage. This branch also administers the Seed Control Act, and at the last session of Parliament the administration of the Commercial Feeding Stuffs Act was also placed under the charge of this branch.

There are four divisions in the Seed Branch, namely:—

- Seed Testing Division.
- Seed Inspection Division.
- Seed Markets Division.
- Seed Purchasing Commission.

The Seed Testing Division maintains and operates Government Seed Laboratories at Ottawa, Winnipeg, and Calgary, where purity analyses and germination tests of seed samples for farmers, seed merchants, and institutions are carried on. Official samples taken by customs officers from seed importations, by seed inspectors under the Seed Control Act, and for special investigations are also tested at these laboratories. A great deal of investigational and research work with seeds has been carried out during the past few years, and some valuable work connected with the micro-analytical tests of feeding-stuffs has also been brought to a favourable conclusion.

The Seed Inspection Division enforces the Seed Control Act. The inspectors connected with this division

inspect seed grain and fibre flaxseed received into, and shipped from Government elevators or other warehouses by the Seed Purchasing Commission, or other dealers. Certain importation regulations are applied, and general quality standards for the various grades of clover and grass seeds have also been fixed. Samples submitted to the seed laboratories for test are graded and reported on by this division.

The Seed Markets Division compiles and issues semi-monthly seed market reports, prepares and distributes lists of reliable seed importers in other parts of the Empire and foreign countries. It also supervises the administration of the subventions paid by the Seed Branch to the various provinces in connection with seed fairs and field crop competitions. During the war years this division, in collaboration with the Division of Forage Plants of the Experimental Farms Branch, also arranged for the production of a large quantity of field root seed of which at that time it was anticipated there would be a serious shortage. Advertising and other means are resorted to in order to bring about the extension of markets for Canadian seed.

The Seed Purchasing Commission has now been in operation for some four years. It was originally established as a war measure in order to insure a supply of good seed for farmers in certain areas which had been devastated by drought or other causes, and has been in operation since that time. This Commission purchases, stores, cleans, and distributes at cost inspected seed of good quality to those districts where there is a seed shortage. It has already done a business of over three million dollars per year.

The outside work of the Seed Branch is carried on by a field staff of inspectors. For the purposes of administration the Dominion is divided into six districts, each of which has a district seed inspector in charge. The officers

in these districts are occupied with seed inspection, inspecting field crops, obtaining market information, judging seed, and addressing meetings.

It is anticipated that the new Commercial Feeding Stuffs Act will be put into operation early in the coming year, and this will of course necessitate a large increase in the activities of the Seed Branch.

ENTOMOLOGICAL BRANCH

The Entomological Branch occupies itself with studies of means of control for injurious insects affecting all agricultural products. It also administers that part of the Destructive Insect and Pest Act which has reference to insect diseases. For purposes of administration the branch is divided into four divisions:—

The Division of Field Crop and Garden Insects conducts life-history studies and studies methods of control of insects injurious to field and garden crops. Outbreaks of injurious insects are investigated, and control measures organized. Specimens are identified, and some work is also carried on with investigations in reference to insects in green-houses.

The Division of Forest Insects investigates outbreaks and organizes methods of control for insects affecting trees. Forest sample plot areas have been established in various districts so that the study of these insects may be facilitated.

The Division of Foreign Pests Suppression enforces the Destructive Insect and Pest Act as it refers to insects. For this purpose fumigation stations are established at a number of points and all nursery stock imported is inspected and fumigated at these stations. Whenever necessary, quarantines and embargoes are laid against foreign and native insect pests, and enforced by this division. The division also conducts scouting work in connection with outbreaks of injurious insects.

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The Division of Systematic Entomology has charge of the National Collection of Insects. This division does most of the identification work of the branch, and is also occupied in mounting and preparing material for addition to the National Collection.

The Entomological Branch also conducts investigations into insects affecting fruit, insecticides; the colonization, liberation and recovery of parasites of various insects, as well as orchard spraying and potato spraying experiments.

The field work of this branch is conducted from ten entomological field laboratories, stationed in various parts of the country. Each of these is in charge of a competent entomologist, and from these field laboratories local insect conditions are studied.

FRUIT BRANCH

The Fruit Branch administers the Inspection and Sales Act as it affects fruit, fruit packages and potatoes. Its work also consists of the general encouragement of the fruit industry, especially the marketing of fruit. Fruit and vegetable crop reports are published at periodical intervals, and the officers of the branch assist producers and dealers in buying and selling their fruit. The fruit inspectors also address meetings of fruit growers, and give demonstrations of the proper methods of picking, grading and packing fruit. Special transportation officers are employed to give assistance and advice to shippers as to the proper routing, etc., of fruit shipments. Complaints of improper shipments of fruit are investigated, and improved methods of distribution studied. Matters connected with fruit transportation generally are discussed with railway, express and steamship officials with a view to devising means for improved methods in this regard.

PUBLICATIONS BRANCH

The distribution of the numerous publications issued from time to time by the Department of Agriculture is carried on by the Publications Branch. Most of the branches publish from time to time bulletins, pamphlets, circulars, etc., and the Publications Branch maintains mailing lists and sees that all persons on these mailing lists receive the publications which they desire. This branch also has charge of the publication of the official departmental magazine, *The Agricultural Gazette*, and of other publicity material.

INTERNATIONAL INSTITUTE BRANCH

The International Institute of Agriculture serves as the connecting link between the Canadian Department of Agriculture and the International Institute of Agriculture at Rome.

This branch obtains and publishes through the press, and through *The Agricultural Gazette* information on matters pertaining to world agriculture which it receives through the central offices of the Institute.

It also provides the Institute with information with reference to Canadian agriculture, and the Institute Commissioner represents the Canadian Department on the International Institute.

The departmental library is also under the control of this branch.

AGRICULTURAL INSTRUCTION ACT BRANCH

Under the Agricultural Instruction Act the sum of \$1,100,000 annually for a period of twenty years was appropriated to assist the provinces in agricultural instruction work.

This branch administers this Act, and makes the necessary grants to the various provinces for the purpose of providing agricultural instruction and demonstration, and agricultural education in colleges, agricultural schools, high schools and elementary schools.

SOME ACTIVITIES OF THE YEAR 1920

BY J. A. RUDDICK, COMMISSIONER, DAIRY AND COLD STORAGE

DURING the war some of the activities of this branch became more or less inoperative on account of the prevailing confusion. For instance, it was impossible to carry out the cargo inspection service properly, both at Canadian ports and in the United Kingdom, on account of the irregularity of sailings, the disorganization of the regular steamship lines, and the secrecy which covered the movements of all vessels. With a return to more normal conditions the cargo inspection service was re-organized for 1920 and has been functioning as usual throughout the season. Thorough inspection has been made at Canadian ports of perishable food products loaded for overseas shipment, and similar reports were received regularly from the inspectors in the United Kingdom. Recording thermometers were placed with practically all shipments in connection with which the question of temperature was important. Irregularities in the handling of produce, defects in packing, etc., are reported direct to shippers.

Finch Dairy Station

The commercial operations of the Finch Dairy Station have been very successful during the past season. Some butter and cheese were manufactured, but generally speaking a better return could be obtained for milk or cream disposed of through the milk distributors in Montreal or Ottawa and the condensed milk factory at Chesterville. By offering the product for which the best relative price could be obtained at the time, the salesman has been able to secure returns to the patrons considerably in excess of those which were secured at factories where the output was confined to one product only. The

net return per 100 pounds of milk supplied throughout the year from January to October was as follows:—

January.. . . .	\$3.50
February.. . . .	3.22
March.. . . .	2.70
April.. . . .	2.37
May.. . . .	2.49
June.. . . .	2.38
July.. . . .	2.24
August.. . . .	2.28
September.. . . .	2.45
October.. . . .	2.63

The returns for November and December are not yet available.

The Finch Dairy Station is operated as a model factory and as a commercial demonstration of the advantage of having factories equipped for the manufacture of either butter or cheese or for the sale of milk or cream at short notice. The operation of the station serves to keep the experts of the Dairy Branch in close touch with the problems of milk production and dairy manufactures, and provides facilities for conducting experiments and for trying out new apparatus or new processes in the manufacture of butter or cheese. Being operated the year round, it serves to encourage the production of winter milk. During the winter of 1912-13 (December to March, inclusive) the total quantity of milk received was 208,937 pounds. During the same period in 1919-20 the total quantity delivered was 862,165 pounds. In the month of December, 1919, there was nearly four and a half times as much milk delivered as in December, 1912.

The yearly supply of milk has increased from 2,069,281 pounds in 1912 to 5,480,816 pounds in 1919, and there will be a further increase in 1920. The prevailing rates are charged for the manufacture of butter or cheese and for the

handling of milk and cream, and the revenue from this source exceeds the total annual expenditure by several thousand dollars. A review of the work of the Finch Dairy Station for the years 1912 to 1919 is given in bulletin No. 55 of the Dairy and Cold Storage Series.

The Grading of Dairy Produce

A new line of work was undertaken in 1920 in the grading of export cheese, which is sold by auction at Montreal. Several of the provinces have been doing more or less grading of cheese and butter for educational purposes and for domestic trade during several years past, and the staff of this branch has endeavoured to promote uniformity in the grading under different provincial authorities by holding conferences of graders and in other ways co-ordinating the work so as to secure uniformity in methods and results. The standards and definitions adopted at the last Dominion Dairy Conference are now universally followed, and it is gratifying to be able to state that there is a remarkable uniformity in the work which is being done throughout the Dominion in this respect. It seems quite probable that there will be considerable extension of the system of grading in the near future. It will facilitate trading, establish confidence in our products abroad, and it is the best means to secure just rewards to the factory or maker that turns out a superior article. The policy of this branch, approved by the minister, is that when producers and traders are ready for a complete system for the grading of dairy produce for export the branch will be prepared to undertake it.

Dominion Educational Butter Scoring Contest

The Dominion Educational Butter Scoring Contest, inaugurated in 1919, was repeated in 1920. Samples of butter

were received from all the provinces monthly from May to October. These samples were scored regularly at Montreal and reports sent to all the creameries in Canada. It is hoped to continue this work in a somewhat modified and extended form in 1921.

Cow Testing

The cow testing work, which has been carried on by this branch for a number of years, was extended considerably during the year under the senior dairy promoter, a new officer appointed in the fall of 1919. Our aim is to co-operate as far as possible with the provincial authorities in the matter of cow testing. Very substantial assistance has been rendered by the Departments of Agriculture of Quebec, Nova Scotia, and Manitoba. We have also co-operated with the Departments of Education in Nova Scotia and Manitoba with a view of interesting school children in this line of work. At a conference of deputy ministers of agriculture held in Ottawa in the spring of 1920 it was announced that whenever the provinces felt inclined to take over this work the Dominion Department would be glad to transfer it to them. In all probability several of the provinces will undertake the cow testing work in the near future. It would seem as though the provincial organization, with numerous field men at work, could handle the cow testing rather better than it can be handled from Ottawa.

Cold Storage

Owing to the resignation of the cold storage inspector on July 1, we have been obliged to mark time to some extent in this particular activity, pending the appointment of a successor by the Civil Service Commission.

A number of creameries have received the usual bonus for the erection of suitable cold storages.

Early in the year a complete list of the cold storage warehouses in Canada,

giving particulars as to size, equipment, and character of business carried on, was compiled and published for the information of those interested in such matters.

Refrigerator Car Services

The usual refrigerator car services for the carriage of butter in small lots and for the carriage of cheese in car loads were in operation throughout the warm months of the year. The iced butter cars were operated regularly on a weekly schedule over certain routes leading to Toronto, Montreal, and other markets. The shippers are charged the regular "less than car load" rates, and the department guarantees the railway two-thirds of the earnings of a full car load from starting point to destination. This service provides facilities for the shipment of small quantities of butter weekly under proper conditions. Without such an arrangement, shippers would have to provide their own refrigerator cars and hold the butter for sufficient time to accumulate a car load, or otherwise pay excessive charges on small quantities. The department accepts from the railway companies bills for the icing charges on a limited number of cars weekly for the carriage of cheese to Montreal.

Dairy News Letter

A new service which seems to be popular is the publication of a Dairy News Letter once a month, containing

news items relating to the dairying industry gleaned from journals, reports, correspondence, and other sources. This letter has been sent monthly to every cheese factory and creamery in Canada and to any person who applies to have his name put on the mailing list.

Dairy Market Reports

A Dairy Market Letter has also been issued weekly and telegraphic reports were sent out twice a week throughout the season. Paid telegrams are sent to designated officials in various districts from whom information can be obtained by cheese factory and creamery salesmen, or others who are interested in the market. "Collect" market telegrams are sent regularly twice a week to any person who makes a request for them. The Dairy Produce Market Letter sent out on Monday afternoons contains market information from the Montreal and Toronto markets up to one o'clock on that day. The report is sent regularly to any person who applies for it.

Dairy and Oleomargarine Laws

New regulations governing the sale of oleomargarine came into effect on September 11, 1920. It is now required that the word "Oleo" shall be stamped or impressed on the product itself in letters of specified size. The use of the words "butter," "creamery," "dairy," or the name of any breed of cattle is prohibited in any form of advertising or description of oleomargarine or on any package containing oleomargarine.

THE SEED PURCHASING COMMISSION

BY A. E. WILSON, COMMISSIONER AND CHIEF AGENT

OWING to the severe drought during the summer of 1919, which extended principally over the greater parts of southern Alberta and Saskatchewan and the southwestern part of Manitoba and to a lesser extent over smaller areas in other parts of the

three Prairie Provinces and caused a partial failure (and in many districts a complete failure) of the crops of wheat, barley, oats and rye, it was essential that substantial supplies of these grains, suitable for seed, should be purchased and special binned so as to insure the

seed requirements for the succeeding spring. With a view to securing the most suitable part of the crop for seed purposes before the grain began to move out in volume to the lake front and to the mills, purchasing was started on October 1, 1919.

All cars of grain before being purchased by the commission were carefully inspected by qualified seed inspectors at time of unloading as to their suitability for seed, and when found to be up to the seed standard as defined in the Seed Control Act, they were separately binned according to seed and commercial grades, and an "inward" seed certificate issued for each car. The seed was again inspected after being recleaned for shipment and an "outward" seed certificate issued guaranteeing its quality, purity and germination.

Through an arrangement with the Canadian Wheat Board and the railways, all cars of wheat passing through to the lake front and destined for the mills at Moose Jaw, Saskatoon, Medicine Hat and Calgary, during the month of October, were held up in the railway yards at these points for a preliminary inspection by seed inspectors, and those cars which they considered suitable for seed were diverted to the Government interior elevators to be re-inspected and special binned for account of the commission. A number of the cars so diverted were rejected as unsuitable for seed by the seed inspectors stationed at the elevators and placed in the commercial bins. This could not have been avoided, owing to the short time allowed by the railways for inspection in the yards and the large number of cars to be tested. The rejections were mainly on account of excess moisture content which it was impossible to test in the yards through lack of the usual facilities. These cars were turned over to the mills at first cost to us.

The surplus of seed wheat on hand at the end of the season was turned over to the Canadian Wheat Board on basis of cost (\$2.30 Fort William) plus

carrying charges at the rate of one fifteenth of a cent per bushel per day from date of purchase to date of sale. The difference between the selling price to the Board of this surplus and its market value on date of sale amounted to about \$100,000, which was turned into the "pool" created by the Canadian Wheat Board for account of the western farmers, thereby increasing the value of their participation certificates.

The action of this commission (which was approved by the Minister of Trade and Commerce and sanctioned by Order in Council) in effecting a minimum reduction of 40 cents per bushel on the price of seed wheat at country elevators in the drought areas to needy farmers, met with the general approval of those who harvested a crop, notwithstanding that this action would result in a reduction in the value of their participation certificates to the extent of the difference on the quantity sold for seed at country elevators, on the basis of \$2.45 Fort William (to which no carrying charges were added) and the prevailing prices to the mills of \$2.85 per bushel, and, later in the season, of \$3.15 per bushel.

With a view to reducing the cost of seed to a minimum, and in accordance with the recommendation of the Minister of Agriculture, the commission contributed to the funds of the Canadian Wheat Board the carrying charges on wheat sold for seed at country elevators and same were charged against the cost of our wheat stocks unsold at the time the agreement was made. The action of the commission in not increasing the selling price of seed wheat to meet the advance of 50 cents per bushel (and at a later date of 85 cents per bushel) made by the Wheat Board, enabled many farmers in the drought areas, who had not the means to pay a higher price, to secure their full seed wheat requirements and thus materially increase production.

As regards the seed oat situation, the demand was unusually heavy this

season, partly on account of the late spring. The commission was not quite able to meet the demand, notwithstanding that we had been in the market from September, 1919, to May 31, 1920, and offered substantial premiums for selected oats. Our system of offering a fixed premium over the market on date of purchase has proven most satisfactory from every standpoint, particularly as it has the effect of practically appointing every grain dealer in the West as a purchasing agent, thus encouraging them to separately bin the best of the crop, thereby enabling us to accumulate substantial supplies of selected seed and to avoid the heavy expense that would be involved in our maintaining a staff of travelling purchasing agents and the risk of loss through the different disadvantages of purchasing at country points. Our total purchases of seed oats amounted to 1,287,751.28 bushels, which represented a very high percentage of the oats, coming up to our seed standard as to quality, purity and germination, offered for sale from last year's crop.

I am pleased to state that our relations with the grain trade at Winnipeg and Calgary have been most satisfactory to all concerned, and that they willingly co-operated with us in securing the great bulk of our best available oats suitable for seed. The members of the grain trade operating in Western Canada have repeatedly expressed their approval of the work done by the commission in the general interests of agriculture, and stated that it would be practically impossible for private enterprises successfully to finance and hold over sufficient supplies of the best grades to meet the very extensive demand during the sowing season for seed of the high standard handled by this commission.

If we had not been in the market since early last fall a very substantial percentage of the best oats would have been ground at the mills and used for feed on the farms and thus lost to the

country for seed purposes. This would have resulted in a very serious shortage of seed oats this season and in a consequent decrease in acreage sown. The cost of seed to the farmers would also have been considerably higher.

There was a strong demand for seed barley and we had some difficulty in securing sufficient to fill all orders received by us, owing to the scarcity of barley suitable for seed purposes. A high percentage of last year's crop graded lower than 3 C.W. and it was difficult to secure a supply from stocks of 3 C.W. that would grade up to the seed standard.

We did not actually purchase a large stock of winter rye as there was no evidence of a demand up to the end of June, and as we did not wish to have a surplus of high-priced rye on our hands at the end of the season. Owing to high winds in the southwestern parts of Alberta in the early summer, a considerable acreage sown to wheat was blown out and the farmers in those districts decided to re-seed this acreage during August and September with winter rye. This resulted in a heavy and unexpected demand for seed. We immediately got into touch with the owners of available stocks in Alberta and Saskatchewan, and, in co-operation with the members of the grain trade at Calgary, arranged for the distribution of about 50,000 bushels through the blown-out areas, which was sufficient to fill all requirements.

The oats, barley, and rye were purchased from farmers, farmers' organizations, and elevator and grain companies (in their capacities as owners and as agents for farmers) and the wheat from the authorized agents of the Canadian Wheat Board. As all grain purchased by this Commission is specially selected by seed inspectors as being superior in quality, purity, and germination, premiums, varying from five to ten cents over the Fort William price on date of purchase, were paid on oats, barley, and rye, but no premiums were paid on

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wheat, the price being the same as charged to the mills by the Canadian Wheat Board.

The Commission purchased 1,040,424.30 bushels of wheat, 1,287,751.28 bushels of oats, 17,197.26 bushels of barley, and 2,769.36 bushels of winter rye.

All sales were made on a strictly cash basis, payments being made in advance of shipments or by drafts attached to "order" bills of lading. A large percentage of our sales was made to farmers through municipalities, local grain growers' and other farmers' organizations, and through Provincial Governments. The balance was made direct to farmers and to departments of the Dominion Government. The seed distributed by the Commission has evidently given general satisfaction, as is evidenced by the large number of letters we have received expressing appreciation of its quality, purity, germination, and reasonable price.

We supplied a substantial percentage of the seed requirements of the returned soldiers, principally through the Soldier Settlement Board, this year at a discount under our regular selling prices, and the probabilities are that they will require much larger quantities next year, as very large areas of Indian, school, and new prairie lands will be under cultivation by then. It is scarcely necessary for me to refer to the importance of supplying these men going on to new land with good clean seed, and to the resultant benefits to the men themselves, as well as the Government, whose

security will be enhanced by the prosperity of these settlers.

This season our seed grain was distributed throughout the three prairie provinces, excepting a few carloads of wheat and oats to British Columbia, 50,000 bushels of seed wheat exported to farmers' organizations in Montana, and about 25,000 bushels of seed oats to points in Ontario and Quebec. With the exception of about 8,500 bushels, which were sold for feed, all oats purchased by the Commission were cleaned and sold for seed. 160,564.07 bushels No. 2 feed oats, representing the oat screenings which were cleaned from our seed stocks, were held over for a favourable market and sold for feed purposes at an average of about \$1 per bushel.

The Commission received, through the Department of Agriculture at Ottawa, various credits during the season amounting to \$3,807,000, and have up to this date returned, through the Receiver General, the sum of \$3,981,678.01. To the latter will be added the remaining assets, consisting of \$6,457.90, representing outstanding claims on railways; \$1,140.42, representing cash in bank; and \$3,120.39, representing value of sacks and grain on hand. The credit balance is thus \$185,396.78.

The cost of maintaining the Commission for the year was \$24,077.10, which included staff salaries, travelling and office expenses. The inspection service provided by the Seed Branch cost \$16,405.95. The net balance, \$144,913.73, would be sufficient to pay a fair rate of interest on the \$3,807,000 advanced on requisition of the Seed Commissioner.

"The Government of Canada has already embarked upon a plan of generous assistance to those of our returned men who wish to go upon the land, and I am glad to bear my tribute of acknowledgment that the work the Government has done in this respect appears on the whole to have been well justified."—Hon. T. A. Crerar, M.P.

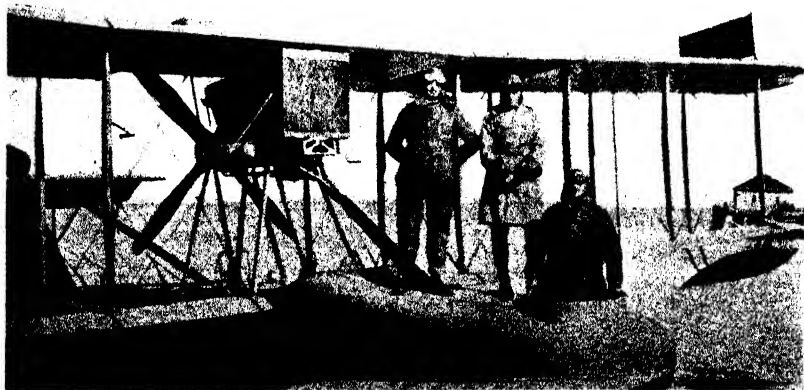
A SURVEY OF OUR FORESTS FROM THE AIR

BY J. M. SWAINE, CHIEF, DIVISION OF FOREST INSECTS

THROUGH the co-operation of the Air Board, the Commission of Conservation and the Entomological Branch, an interesting experiment in aerial forest reconnaissance was conducted last summer over the country north and west of lake Timiskaming in northern Ontario. The Air Board furnished a Curtiss flying boat, type F.3, with a wing spread of 78 feet, and equipped with a 360-h.p. Liberty engine. In addition to the pilot the machine carried two observers.

Messrs. R. D. Craig and S. H. Edgecombe conducted the forest reconnaissance for the Commission of Conservation, and the writer and Mr. M. B. Dunn that for the Forest Division of Insects of the Entomological Branch.

In connection with their survey of the forest resources of Ontario Messrs. Craig and Edgecombe determined the feasibility of aircraft work for the special investigation they were conducting. In four days' flying they mapped in the main timber types, such as con-



TYPE OF FLYING BOAT USED IN FOREST SURVEY

Colonel Robert Leckie, D.S.O., M.C., D.F.C., piloted the machine from Ottawa to Haileybury, with Mr. Clyde Leavitt, Chief Forester of the Commission of Conservation, and the writer as passengers. The trip by way of Mattawa and North Bay, covering 336 miles, was made in five hours' flying time. Colonel Leckie had to return to Ottawa for his trans-Canada flight, and left Captain P. Wickens, A.F.C., as pilot. Later, Captain C. McEwen, M.C., D.F.C., relieved Captain Wickens.

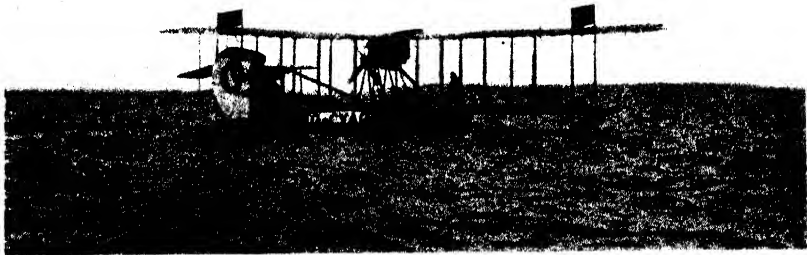
ifers, hardwoods and mixed forests, recent burns, muskegs and clearings in approximately 1,800 square miles of the region around Temagami lake. At an altitude of 3,500 feet it was possible to distinguish the more conspicuous species of trees, and together with a limited amount of ground work in the various types, to secure a comprehensive knowledge of the forest conditions on a large area in a very short time. Three weeks were spent in the aerial survey about lake Timiskaming, and it is estimated

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that to obtain the same amount of information by ground survey it would have taken two men at least eight months.

The officers of the Division of Forest Insects of the Entomological Branch studied an extensive spruce budworm outbreak spreading through the northern pulpwood forests from northern Quebec across the interprovincial boundary into Ontario. A strip of country more than 100 miles long and 25 miles wide, had been freshly infested during the last two summers, and the injury was spreading westward. It was very important to determine the

spruce stands. There is the added drawback that the party cannot foretell how far or in which direction it must travel to reach the boundaries of the infestation, and it is, therefore, difficult to outfit properly. The possibilities of an air survey appealed to us strongly, and the results were even beyond our expectations. From a height of 3,500 feet it was possible to determine the different types of timber and to locate the blocks of spruce and balsam accurately. The budworm-infested trees are reddish or yellowish in colour, and from the air they were easily distinguished and the area of infestation could be readily



ON LAKE TEMISKAMING, NORTHERN ONTARIO

area covered by the outbreak last summer and to obtain definite data upon the rate and direction in which the injury was spreading.

A ground survey party attempted to obtain the information we required, but it was impossible to cover the whole area in that manner before winter. The spruce budworm outbreak spreads only in spruce and balsam. Much of the Temagami country carries strips of hardwoods with pine along the water courses, and since the latter offers the only available route for a rapid survey, it is evident that a ground party must have difficulty even in locating the balsam and

determined. The information thus easily obtained through a few days' flying would have taken two men more than six months to acquire by hard work by ground surveys.

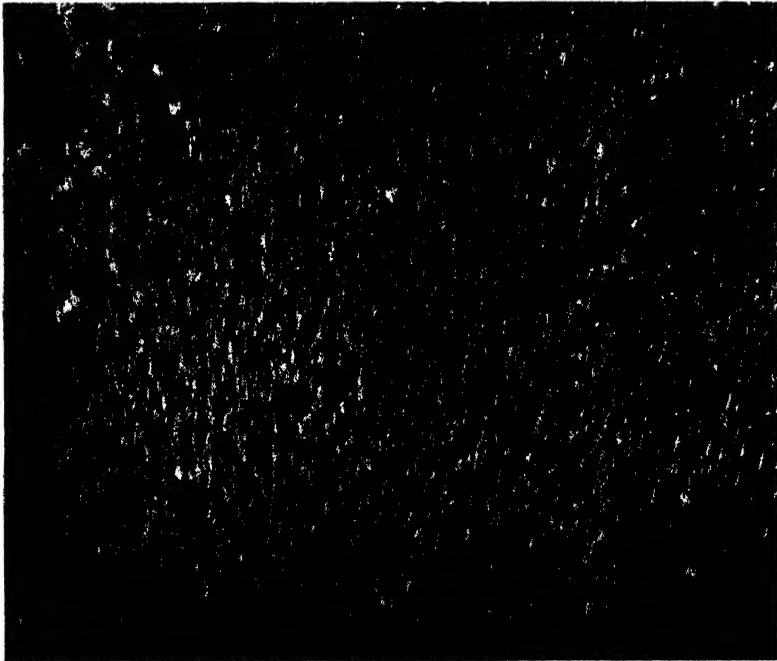
The view from the air enables us to determine only the area attacked, and with some accuracy, the severity of the infestation. It is necessary to supplement this work by short ground surveys then easily planned and to study minutely the nature and effect of the injury.

It is not possible yet to foretell how far west this budworm infestation will spread, but it will probably reach the

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Great Lakes within the next few years. It has apparently not yet affected the black spruce forest north of the height of land. If these air surveys can be continued each summer we can determine exactly, by a few flights during midsummer, the boundaries and rate of

of balsam and spruce over an area more than 100 miles long and 25 to 50 miles wide. To prevent the spread of the injury it would be necessary to destroy the majority of these caterpillars, and this could only be effected artificially by burning the spruce and balsam over all



FOREST IN THE TEMAGAMI REGION, NORTHERN ONTARIO, AS SEEN
FROM A HEIGHT OF 3,500 FEET

progress of the infestation, and this information will aid the limit holders to salvage their timber in time.

It is apparently impossible to check the spread of this outbreak through any practical artificial means yet known to us. The young caterpillars are hibernating in countless myriads on the twigs

this area, a proposal that is, of course, unthinkable. Adverse weather conditions, combined with parasites, may occur to control the outbreak in time to save most of the timber, or, lacking these natural control factors, it may sweep onward like a great fire and die out only through lack of food material.

■ ■ "The farmer and his family are of more consequence even than the farm. Education both industrial and cultural, is necessary to intelligent farming and to development of mind."—
Dr. K. L. Butterfield, President, Massachusetts Agricultural College.

FLAX FIBRE AND TOW GRADING

BY ROBT. J. HUTCHINSON, CHIEF OF FIBRE DIVISION

IN Ireland and Belgium, where the inspection of flax is easily effected, the buyers and merchants visit the markets and select exactly what suits each spinner; but such a method is neither possible nor advisable in Canada, where fixed grades should be standardized. These in time will become known, and each mill owner can in this way build up a reputation for his particular marks.

The aim of Canadian growers should not be to produce the very highest quality of flax, such as Courtrai or Irish top grades, but, rather, good medium flax, equal to medium Belgian and Irish grades, of which very large quantities can be used. After grading, the flax is carefully tied in bundles, and is then ready for baling.

There are two principal grades of flax fibre, warp and weft, which are further subdivided according to qualities. Warp is generally broader fibred, stronger and more ribbony flax, and the yarn spun from this is used by weavers for the warp or longitudinal threads of the cloth. Weft is soft, more pliable flax, not necessarily so strong as warp, and is used for the yarn which goes in the shuttle running across the cloth, to fill it up.

In both warp and weft there are innumerable grades, and careful assortment is necessary in order to secure the full value of each quality of flax produced, because owing to the great variety of articles into which flax is manufactured, there is a demand for many different qualities, and what suits one spinner may not always suit another. In sorting flax, water-retted (either pond or running water) must be kept entirely separate from dew-retted, and on no account should these classes be mixed in the bales. It has already been pointed out that they colour differently

when the yarn made from them is boiled or bleached.

In judging flax the principal qualities are:—

- (1) Strength.
- (2) Weight for bulk.
- (3) Colour and uniformity.
- (4) Silkiness or oiliness.
- (5) Fineness and distinctness of separate fibres.
- (6) Length.
- (7) Cleanness.

Strength is the first requisite, and this can be accurately judged by the force and snap necessary to break a few of the fibres, for the value of flax is primarily dependent on its strength, and the grower must aim at securing this essential requirement. A strong flax is usually a weighty flax, and the first feel of the "head" when balanced in the hand gives a fair indication of both. The colour should be uniform, but spinners do not now attach so much importance to colour provided the flax has the required strength and quality. Silkiness and oiliness are essential to good spinning and yield, while dry bare fibre never gives the same results in working, and always lowers the value of the product. Fineness and distinctness of separate fibres are the real indication of quality, and can be judged by the splitting of the flax into separate fibres when rubbed with the finger-nail. Length generally characterizes good, well grown flax, but it is not of great importance, though, of course, a long flax generally gives a better yield per acre to the grower, as length signifies weight and an abundance of fibre. The subject of cleanness has been dealt with under scutching, and the thorough removal of all shive and dirt from the flax, especially at the root ends, must be insisted upon.

Grades—Water-retted qualities—

- W.P.A. Superior water-retted warp;
- W.P.B. Medium water-retted warp;
- W.P.C. Ordinary water-retted warp;
- W.T.A. Superior water-retted weft;
- W.T.B. Medium water-retted weft;
- W.T.C. Ordinary water-retted weft.

Dew-retted Qualities—

- D.P.A. Superior dew-retted warp;
- D.P.B. Medium dew-retted warp;
- D.P.C. Ordinary dew-retted warp;
- D.T.A. Superior dew-retted weft;
- D.T.B. Medium dew-retted weft;
- D.T.C. Ordinary dew-retted weft.

Recovery of Flax Tow

In the process of scutching a certain quantity of shorter and weaker fibres is pulled away by the scutching blades, and this material can be collected from behind the scutching mill and re-scuted. This is generally done on one or more scutching wheels kept for this purpose, and the material resulting from this is called "tow," which, when properly cleaned, is worth rather less

than half the value of flax. There is also a smaller amount of combings from cleaning the ends of the scuted flax, which is a much finer grade of tow, or pullings and should be kept separate.

The tow should be classified in two or three grades, the best or well cleaned material being packed separately from the inferior or dirty material to which shive still adheres, due to inadequate retting or other causes. In this case also, the tow from dew-retted and water-retted flax must be kept separate. A standard method of classifying tow might also be introduced into Canada.

TOW	{	Superior dew-retted tow;
D.A.		
TOW	{	Medium dew-retted tow;
D.B.		
TOW	{	Ordinary dew-retted tow;
D.C.		
TOW	{	Superior water-retted tow;
W.A.		
TOW	{	Medium water-retted tow;
W.B.		
TOW	{	Ordinary water-retted tow.
W.C.		

NEW VARIETIES OF FIBRE FLAX

BY DR. C. E. SAUNDERS, DOMINION CEREALIST

AT the time when the Flax Fibre Division of the Experimental Farms Branch was organized, the Dominion Cerealists was carrying on plant-breeding experiments in flax both for seed and for fibre. As these experiments had been in progress for some years, it was thought best for him to continue the work rather than to hand it over to the newly-formed division. Since that time, good progress has been made in selecting out promising strains from among the very large number of new cross-bred varieties which were obtained. Up to the present, such small quantities of these sorts were on hand that they had to be propagated

for seed only. Under such circumstances, a fair test of fibre quality cannot be made. It is proposed, therefore, commencing next season, to sow a series of plots of new varieties to be harvested for fibre purposes. Arrangements will be made to carry on the retting under suitable conditions so that the quality of the fibre derived from each of these varieties may be fairly representative, and so that the different sorts can be easily compared. It is believed that considerable advancement in the growing of flax for fibre can be attained by the introduction of pure, improved sorts of especially high quality for fibre production.

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THE DISSEMINATION OF VARIETIES OF FRUITS, VEGETABLES AND FLOWERS

BY W. T. MACOUN, DOMINION HORTICULTURIST

MANY new varieties of horticultural plants have been originated in the Horticultural Division during the past thirty years, some of which have proved of great merit. A few of these have found their way into the trade, but the majority have not. The method of dissemination in the past has been to give a few plants or seeds to those who would be likely to take an interest in testing them with the understanding that a report be made in regard to their behaviour. This method is satisfactory until a variety has been proven to be desirable for commercial plantations, after which it is much too slow a way of getting things introduced into general cultivation.

It has, therefore, been decided to sell plants and seeds of promising new varieties in the future in the hope that this will be a better way of drawing

attention to their merits and ensure their coming more quickly into prominence. After a variety is listed by the principal nurserymen it is proposed to discontinue the sale of it from the Experimental Farms.

While there will be little to offer for sale in the spring of 1921, it is expected that by the autumn a considerable number of plants of gooseberries, currants and raspberries will be for sale, but plants of the Portia strawberry will be offered in the spring. This variety has proven the best canning variety tested at Ottawa and Vineland. It is handsome in appearance, of good quality, and a good cropper.

Provision has been made for beginning the propagation of a much larger number of plants of the new varieties than has been possible in the past.

EFFECT OF DIPPING ON THE PRODUCTION OF MILCH COWS

BY DR. F. TORRANCE, VETERINARY DIRECTOR GENERAL

DURING the dipping of cattle for the eradication of mange in the southern part of the province of Alberta, careful records were

kept of the milk production of eighty-seven dairy cows for two days preceding and two days after dipping, and the following figures were obtained:—

Total milk produced by the 87 cows:—

	June 24	June 25	June 26	June 27
	3,128.4 lb.	3,161.4 lb.	3,051.9 lb.	3,113.6 lb.
Average per cow..	35.15 "	34.84 "	34.27 "	34.98 "

This shows the effect on milk production of the dipping of this dairy herd in the official lime and sulphur solution in the standard cage vat when the temperature was maintained at from 110° Fah. to 118° Fah.

It is evident that the objection of many stockmen to the dipping of milch cows is not well founded, as they can be dipped without affecting the secretion of milk to any appreciable extent.

EXPLORATION FOR NEW PLANTS

BY W. T. MACOUN, DOMINION HORTICULTURIST

A NEW line of work begun by the Horticultural Division in 1920 is the systematic search for promising forms of wild native fruits, flowers, trees, and shrubs. Canada has been far behind other countries in this respect. Explorers have for many years been sent in search of new plants to many parts of the world from Great Britain and the United States, and a vast number of valuable new plants have been discovered and brought together through this means. The United States has had explorers in Canada during recent years to search for wild fruits, especially in the colder parts of Canada,

that would be useful for them in their breeding work, as it is believed that the native material offers a very rich field for obtaining new characters in cultivated plants. Mr. W. J. Boughen, Valley River, Man., was employed to carry on this work for the Horticultural Division in 1920. He travelled during the growing season about the provinces of Manitoba, Saskatchewan and Alberta, and collected a large amount of promising material, part of which was sent to the Experimental Station, Morden, Man., and part to the Central Experimental Farm, Ottawa. It is planned to continue this work in 1921.

IMPROVED TRANSPORTATION SERVICE

BY G. E. MCINTOSH, FRUIT TRANSPORTATION SPECIALIST

TRANSPORTATION as applied to fruit and vegetables is recognized as of such importance to the industries concerned that for three and a half years a division of the Fruit Branch has been devoted entirely to its interests. This division constitutes an intermediary between the shipper and the carrier through which by closer co-operation the many problems relative to the successful marketing of these products are more clearly understood. It is the constant effort of the division to reduce to a minimum the waste made out of transportation and to develop the best possible transportation service for these perishable products.

The relation between the fruit and vegetable producer and cheap, rapid, safe transportation is most intimate. It cannot be too much so. The farmer or fruit grower must have an outlet for his crop. The transportation companies, on the other hand, are somewhat dependent upon the prosperity of these industries in some

of the regions through which they pass. The manifestation of interest by the transportation companies operating in Canada in the development and success of the fruit and vegetable industries, has been quite pronounced. This interest has been shown in our work from time to time and especially within the past few months in their united efforts to facilitate and encourage all phases of the work of investigation and experimentation; to assemble cars and amend tariffs to protect fruit shipments.

What the railroads and express companies have done and are doing, in the way of providing more efficient service, is appreciated in the producing centres throughout the different provinces, but the grower and shipper of perishable foodstuffs, because of the perishable nature of his product, deserves, and must have, every reasonable consideration by carriers. His product requires traffic arrangements from time to time whereby shipments will be handled

expeditiously from producing districts to more distant consuming markets. The Transportation Division of the Fruit Branch endeavours to negotiate these matters when the necessity is proven. For the mutual benefit, therefore, of shippers and carrier, it has recently been possible to improve marketing conditions for the fruit and vegetable growers as follows:—

At Grimsby Beach, Ont., a new Grand Trunk Railway siding to accommodate approximately 15 cars and a fruit express shelter 100 x 20 feet are now under construction. Up to the present there have been no freight loading facilities on Grand Trunk tracks, while the express facilities have also been unsatisfactory.

Special commodity rates have been established applying on shipments of tobacco stems for fertilizing purposes from Montreal, St. John, Farnham, Granby and Quebec to points in the Leamington, Ont., district.

An extension of marketing privileges for Ontario fruits and vegetables has been brought about by the Canadian Express Company establishing carload commodity rates from producing centres to Weyburn, Calgary and Edmonton. Ontario field tomatoes under this arrangement can be marketed in Alberta in competition with tomatoes from the Western States.

An adjustment of freight rates on manure, of which there is a tremendous tonnage for orchard fertilization, was arranged on shipments from Toronto to St. Catharines and points on the Niagara, St. Catharines and Toronto railway.

Tariff provision was obtained for through carload shipping of berries and cherries from British Columbia points to Minneapolis and Chicago.

The Express Companies, while not applying the carload rate, extended the special carload privileges to cover shipments of apricots and plums from points in British Columbia to the Prairies, resulting in a much better distribution and more satisfactory returns to growers.

Improved track and shelter accommodation has been provided at Aldershot, Ont.

The special freight rate on fresh fruits from Ontario points to Winnipeg, Portage la Prairie and Brandon has been maintained by an order of the Board of Railway Commissioners.

Keremeos, B.C., has been accorded improved express and freight service to Vancouver via Princeton and to Calgary and Edmonton.

The special carload express rates for shipments of cherries, berries and currants, moving from British Columbia points to Prairie markets, which it was announced would be discontinued, were re-established for the season of 1920.

PART II

Provincial Government Departments

THE ORGANIZATION OF PROVINCIAL DEPARTMENTS OF AGRICULTURE

The Departments of Agriculture of the provinces of Canada are organized and carried on according to a more or less uniform system varying in accordance with the legislation governing their functions and the direction given to the work by the heads of the respective departments. The differences, if studied side by side, may in some instances lead to modifications. The variation between the departments is more pronounced in the work accomplished and the methods of administration.

It is one of the functions of The Agricultural Gazette, for the purposes of comparative study, to record the actual doings of these departments. In the following articles there has been brought together the present organization of these departments, with a brief indication of the work carried on by each branch and division.

NOVA SCOTIA

BY DR. M. CUMMING, SECRETARY FOR AGRICULTURE.

THE Department of Agriculture of Nova Scotia is presided over by the Hon. G. H. Murray, Premier of the province. The Secretary of Agriculture, who corresponds to the Deputy Minister of other provinces, is Dr. Melville Cumming, who is also Principal of the Nova Scotia Agricultural College. In addition to his general executive duties, as Secretary, Dr. Cumming takes charge of crop statistics, stallion enrolment, and the supervision of the work of the agricultural representatives.

The Department is divided into six main branches: (1) Agricultural Societies, Exhibitions and Associations, (2) Horticultural Branch, (3) Entomological Branch, (4) Dairying Branch, (5) Poultry Branch, (6) Women's Institutes.

The Superintendent of Agricultural Societies, Exhibitions and Associations is Mr. F. L. Fuller. The Agricultural Societies, of which there are 269 in the province, exist mainly for live stock improvement. The Super-

intendent assists where necessary the work of these societies, receives and prepares annual statements, and allots government grants. As Superintendent of Exhibitions this officer administers the county exhibitions in the matter of arranging dates, the appointment of judges, and the allotment of grants. As Superintendent of Associations he receives statements of county Farmers' Associations, allots grants and arranges field crop competitions.

Horticultural Branch.—Mr. P. J. Shaw, the Provincial Horticulturist has supervision over 34 model orchards established throughout the province. He also carries on demonstration work in gardening and orcharding.

Entomological Branch.—The Provincial Entomologist, Mr. W. H. Brittain, administers the Insect Pest and Plant Disease Act, and carries on investigations in insect life, spraying, sprays, and gives demonstrations in these matters.

THE AGRICULTURAL GAZETTE OF CANADA

Dairying Branch.—The Superintendent of Dairying, Mr. W. A. MacKay, has as an assistant Mr. W. J. Bird. The functions of this Branch include the fostering of creameries and cheese factories. The Branch operates three government creameries in Cape Breton. The Superintendent is the secretary of the Provincial Dairymen's Association.

Poultry Branch.—The Superintendent of Poultry, Mr. J. P. Landry, is the head of all organized provincial work for poultry improvement. His duties include the arranging of dates of poultry exhibitions, the appointment and placing of poultry judges, superintending the distribution of eggs and the carrying on of educational work in other directions.

Women's Institutes.—The Superintendent of Women's Institutes is

Miss Helen J. Macdougall. Her duties include the oversight of all activities in connection with Women's Institutes in the province, including the holding of educational courses in household science and similar activities.

The Department of Agriculture and the Nova Scotia Agricultural College are closely identified. So much so indeed that the site of both is at Truro, N.S., and several of the heads of the departments in the general service are also heads of the departments in the College. The College gives a two-year course in agriculture, carries on an extensive farm devoted to the breeding and rearing of all classes of live stock and poultry, and the cultivation of all classes of crops adaptable to Nova Scotia conditions.

NEW BRUNSWICK

BY O. C. HICKS, B.S.A., SUPERINTENDENT, SOIL AND CROP DIVISION

THE head of the Department of Agriculture of New Brunswick is the Hon. D. W. Mersereau. In this province the Deputy Minister is designated the Secretary for Agriculture. This office is held by Mr. Harvey Mitchell. The various branches of the department, the officers in charge of these, and the work undertaken by each branch are given.

Immigration and Farm Settlement, F. E. Sharp, Superintendent. The activities of this branch are carried on in conjunction with the office of the Agent General for New Brunswick in Great Britain. The Superintendent looks after the receiving and placing of farm settlers, farm hands and domestic servants when they arrive in the province.

Elementary Agricultural Education Branch, A. C. Gorham, M.Sc., Director. In close relationship with the

Board of Education, the director provides for elementary instruction in nature study and agriculture in the rural schools, conducts summer courses of study for teachers and prescribes a course of instruction for Grades I-VIII, administers grants to teachers who maintain school gardens, or who secure special instruction in gardening and agriculture at rural science schools.

Agricultural Societies Branch, M. A. MacLeod, Superintendent. This branch administers the grants to 154 agricultural societies. Conducts standing field crop competitions and confers on conventions and educational work such as exhibitions and seed fairs among the societies.

Dairy Division, George Thimens, Superintendent. The Superintendent of the Dairy Division gives instruction and assistance in the establishing and working of associations organized

THE AGRICULTURAL GAZETTE OF CANADA

for the manufacture of butter and cheese in creameries and factories.

Live Stock Division, J. H. King, B.S.A., Superintendent. This Branch has charge of the enforcement of the Stallion Enrolment Act, gives encouragement to the use of pure bred sires, and assists in the co-operative marketing of wool in the province.

Horticulture Division, A. G. Turney, B.S.A., Provincial Horticulturist. The Division of Horticulture gives assistance to the orchard industry in planting, cultivation, spraying and marketing. Holds short courses for instruction, cares for demonstration and illustration orchards, aids co-operative buying of spray material for members of the Horticultural Society.

Soils and Crops Division, O. C. Hicks, B.S.A., Instructor. This Division conducts co-operative demonstration work in field crops. Encourages the production and use of superior seeds.

Drainage Demonstrator, John Woods. This official devotes his entire time

to further the campaign for the installation of tile drains.

Poultry Division, (Superintendent, vacant). The Superintendent encourages and assists the development of the poultry industry.

Apiary Division, L. T. Floyd, Provincial Apiarist. This division encourages and assists the apiary industry. Carries out apiary inspection under the Act for the Suppression of Infectious and Contagious Diseases among Bees, and for the Protection of Bees.

Women's Institute Branch, Miss Hazel McCain, Supervisor. This branch supervises the work of 132 branch institutes, holds short courses in household science, and arranges educational work relating to the home.

Entomological Branch, William McIntosh, Provincial Entomologist. The Provincial Entomologist investigates cases of insect infestation, and advises on methods of prevention and control. Confers on educational work relating to biological subjects.

QUEBEC

BY ARMAND LETOURNEAU, B.S.A., DIRECTOR OF THE "JOURNAL OF AGRICULTURE"

THE Department of Agriculture is the centre of the agricultural movement in the province of Quebec. It is in the department that all movements and activities for the betterment of methods for increasing agricultural production are initiated. The department includes: (1) a Minister; (2) a Deputy Minister; (3) a Secretary.

The work of the department is divided among the following officers, responsible to the Deputy Minister, who is himself responsible for the general administration of the department to the Minister of Agriculture: the chief of the Dairy division; chief of

the Division of Agronomy; chief of the Live Stock division (which is being formed); the chief of the Horticultural division; chief of the Poultry division; chief of the Bee and Maple Sugar division; director of Short Courses; secretary of the Council of Agriculture; director of the "Journal of Agriculture."

The following is a brief summary of the activities of these various divisions:

The Dairy Division

The most important branch of the development that has taken during

the past few years is that of dairying, which includes the following organizations: the Dairymen's Association, the Dairy school at St-Hyacinthe and the Inspection service of butter and cheese factories.

Dairymen's Association.—The Dairymen's Association is the nucleus or basis of the growth of the dairy industry in the province. It was established in 1882, with the object of encouraging and improving the butter and cheese industry and the manufacture of all other dairy produce. It has done very useful work in this line. Up to the present, the Dairymen's Association has splendidly fulfilled its object by establishing the dairy school of St-Hyacinthe and perfecting the inspection system of butter and cheese factories.

Dairy School.—To improve the quality of butter and cheese produced in the province of Quebec, it was necessary to train skilled and competent makers. Such was the object of the St-Hyacinthe dairy school. This school has trained a host of makers who are today disseminated in all parts of the province. They are among the group of workers who have so largely contributed to making our dairy products favourably known on foreign markets and especially on English markets.

A laboratory of chemistry has been added to the school, to conduct scientific experiments in the treatment of milk. Later on, this laboratory was enlarged and analyses were made for the farmers. This laboratory, which is in charge of an official chemist, is known today by the name of the "Provincial Laboratory."

Factory Inspection.—The regular inspection of butter and cheese factories has always been recognized as an indispensable factor towards the improvement of dairy produce. There are 54 inspectors doing this work under the supervision

of two general inspectors. The inspectors are salaried officials and inspection is compulsory.

In the province of Quebec, we have suffered from what may be called the "plague of small factories." The elimination of second and third rate factories was another one of the improvements effected in the making of dairy produce. The owners of small factories must have a profit, no matter how small the quantity of milk they receive, and as a result these factories are poorly built, poorly equipped, they have poor makers and, of course, the quality of the produce is poor. The registration of factories and the issuing of licenses to persons recognized as competent have been the main remedies to this condition of things. Poor factories are now being gradually eliminated and the products are rapidly improving in quality.

The important part taken by the Quebec Cheesemakers' Cooperative Association in the improvement of our dairy products should be mentioned here. Before this association was organized, dairy products were sold ungraded; all products, whether poor or good, obtained the same price on the market. As a result of the organization of this cooperative association in 1910, products were graded and sold by grades, according to their quality. The encouragement that such a measure has given the good makers may easily be realized. They were able to secure top prices for their products whilst poor makers were compelled to improve their products or close their factories. The result was a marked improvement in the quality of marketable dairy products and the elimination of undesirable small factories.

The Division of Agronomy

This division, the second in importance in the department, is still in the organizing stage, being established

only in February, 1920. It now includes three sections, as follows: (a) cereals; (b) fodder plants; (c) farm buildings.

The staff includes a chief for the general direction, a specialist in fodder plants, a lecturer and four instructors.

The cereal section promotes the production and trade of selected seed through: (a) The establishment of demonstration plots, (b) The organization of centres of production, (c) The organization, throughout the province, of seed crop competitions. The work of the cereal division is done in close co-operation with the agricultural associations and the farmers' clubs.

The fodder plant division deals with the production of grasses and leguminous plants, fodder corn and roots. Its work is done through the following: (a) The establishment of demonstration plots, (b) Demonstrations in the threshing of clover seed, (c) Various methods to encourage the construction of silos. The section of rural construction employs experts who prepare plans and specifications of up-to-date farm buildings for farmers. Special grants are provided for the organization of modern stable competitions.

The Division of Agronomy also deals with all questions pertaining to rural economy, systems of culture, rotations, fertilizers, etc. Ploughing competitions are organized as well as various other activities.

The Live Stock Branch

This division is now in the process of formation. It includes: (a) an instructor in sheep husbandry; (b) an instructor in horse husbandry.

Two officials of the Secretary's Office of the Council of Agriculture look after the interest of cattle breeding. This division will be extended later on.

The Horticultural Division

The organization of the division of Horticulture has been through the same stages as all the divisions established up to the present by the Department of Agriculture. There was, at first, a chief horticulturist, whose duty was to encourage the planting, on each farm were conditions were favourable, of an orchard, a vegetable garden and a lawn, for domestic utility and for beautifying the home. Various changes were made from year to year until the division was complete with the following sections: (a) Horticulture, or gardening; (b) fruit culture; (c) preserving and canning of vegetables and fruit; (d) school gardens; (e) entomology, or section of disease and injurious insects (f) horticultural societies.

All these sections have a common object which is the following: (a) to encourage the growing of food plants for the home; (b) to teach practical methods of production and canning; (c) to create a liking for agriculture among the children, by the establishment of school gardens and home gardens, and school fairs.

There are now in the province 61 demonstration plots on the growing of small fruit, 28 demonstration plots on fruit culture; 42 demonstration plots on the growing of potatoes, and 10 on tobacco growing.

In 1920, the following were sold or distributed to the twenty-five horticultural associations now in operation: 17,425 apple trees, 250,000 strawberry plants.

The school garden section has organized during 1920 in sixty counties of the province, a total of 29,687 school gardens or home gardens.

The Poultry Division

The Poultry Division had its beginning in the Quebec Farmers' Experimental Union. Since it was organized in 1911, the Union has endeavoured,

by means of small premiums, and by educational work through the newspapers, to improve the methods of poultry management. Efforts were made to establish, in each parish of the province, an up-to-date poultry house called the "cold poultry house". The following year, twenty-two poultry fattening stations were organized. The poultry division was definitely organized in 1914. Sixteen breeding stations were established during the year and grants were distributed to thirty-nine domestic science schools and the normal schools in Quebec and Montreal to enable them to establish modern poultry plants. Distributions of sittings of eggs to school children were also inaugurated during the same year. The object of this division is to encourage the breeding of poultry of the most suitable breeds for the province of Quebec, to promote modern methods of egg production and fattening of poultry. A number of instructors are employed each year to give demonstrations on caponizing, slaughtering, and packing of fowls for the market.

In co-operation with the Experimental Union, the Poultry Division builds standard poultry houses in the parts of the province where such buildings are not known. It also comes to the assistance of organizers of poultry exhibitions and suggests the adoption of changes, in order to encourage the farmers, by special classes and valuable prizes, without neglecting the fancier.

Short Courses

Each year, from December to April, a score of lecturers, instructors and demonstrators go through the country giving a series of short courses in each locality. Such lectures are illustrated by projections by means of slides, and as many practical demonstrations as possible are given. Last year, these lecturers gave 386 lectures, they visited 312 farms, and

gave 68 demonstrations. The total attendance was 25,912 persons.

The Secretaryship of the Council of Agriculture

The oldest branch of the Department is the Council of Agriculture. It was the origin of all others. The Council of Agriculture is composed of 24 members, 21 of whom are appointed by the Lieutenant-Governor in Council, selected among the prominent agriculturists of the province; the Minister of Agriculture, the Superintendent of Public Instruction, and the Deputy Minister of Agriculture are ex-officio members of the Council. The main duty of these officers is to revise the regulations regarding agricultural associations and farmers' clubs.

The chief administrator of the Council of Agriculture is the Secretary, who belongs to the staff of the department. He supervises the distribution of grants to the agricultural associations and farmers' clubs and also the work of these organizations. He also takes charge of the organization of competitions and of the management of fairs and exhibitions. The Agricultural Merit is also under the direction of the Council of Agriculture.

The Journal of Agriculture

The principal organ of the agricultural associations and farmers' clubs is the Journal of Agriculture, the oldest review of the kind, established in 1878. It is published in two editions, French and English, and has now almost 100,000 subscribers. It deals chiefly with the interests of the farmers of the province and with all things connected with the land. In the 100,000 homes where it enters, the Journal of Agriculture is the advocate of good methods and the champion of rural tradition.

ONTARIO

BY W. BERT ROADHOUSE, DEPUTY MINISTER

THE Minister of Agriculture is the Honourable Manning W. Doherty; the Deputy Minister is Mr. W. Bert Roadhouse; and the Secretary of the Department is J. C. Boylen. The Department conducts the affairs of the agricultural and veterinary colleges, the agricultural schools, and of various branches at headquarters.

Ontario Agricultural College, Guelph, J. B. Reynolds, M.A., President. Conducts two-year and four-year courses and numerous short courses on all phases of agriculture; also three months, one-year and two-year courses for girls in domestic science. Affiliated with the University of Toronto which grants the degree of B.S.A. for the four-year course in agriculture. Also conducts experimental plots in field crops and carries on a great deal of experimental work in the laboratories and in the feeding and handling of live stock.

Ontario Veterinary College, Toronto, C. D. McGilvray, V.S., M.D.V., Principal. Affiliated with the University of Toronto. Conducts four-year course in veterinary science. Degree conferred by University of Toronto.

Agricultural School, Kempville, W. J. Bell, B.S.A., Principal. Opened in the fall of 1920. Intended to give a practical two-year course for boys intending to return to their own farms and will also give short courses, but no degree course. Operates 200 acre farm in connection with the school in order to demonstrate the best methods of breeding and feeding.

Agricultural Societies Branch, J. Lockie Wilson, Superintendent. Administers grants to and work in connection with 350 Agricultural

Societies in the province, also grants to 100 Horticultural Societies, Ontario Vegetable Growers' Association and Ontario Ploughmen's Association. Arranges conventions and educational work in connection with these subjects and also large provincial ploughing match and tractor demonstration.

Live stock Branch, R. W. Wade, B.S.A., Director. Manages the Ontario Provincial Winter Fair at Guelph and supervises work in connection with grants to smaller winter fairs, poultry associations and horse shows. Assists Ontario Sheep Breeders' Association in wool marketing. Has charge of the enforcement of the Stallion Enrolment Act, the carrying on of the Scrub Bull Campaign and other matters of special interest to the live stock industry.

Institutes and Dairy Branch, G. A. Putnam, B.S.A., Superintendent. Supervises work of Women's Institutes, Boards of Agriculture, Farmers' Clubs, and arranges large numbers of meetings and short courses held in connection with these organizations, also supervises work of dairy instruction, butter grading, enforcement of the Milk and Cream Purchase Act, Eastern Dairy School and other matters affecting the dairy industry.

Fruit Branch, P. W. Hodgetts, B.S.A., Director. Has charge of demonstration orchards conducted to give instruction in the best methods of orcharding, supervises Horticultural Experiment Station, Vineland, also work of apiary inspection and instruction and manages fruit exhibition conducted under the auspices of the Ontario Horticultural Association.

Cooperation and Markets Branch, F. C. Hart, B.S.A., Director. Gives instruction in cooperative organization and in the marketing of farm products.

Statistics and Publications Branch, W. O. Galloway, B.A., Director. Compiles agricultural statistics for the province and issues crop reports. Supervises the printing and mailing of the publications issued by the department.

Agricultural Representatives Branch, R. S. Duncan, B.S.A., Director. Supervises and directs the work of 48 local offices located in almost every county in the province.

Vegetable Specialist, A. H. McLennan, B.S.A. Devotes entire time to assisting those engaged in vegetable growing commercially, especially the market gardeners of the province, carries on demonstrations in methods of cultivation and fertilization and combatting disease.

Colonization and Immigration, H. A. Macdonell, Director. Works in conjunction with the office of the Agent-General for Ontario in Great Britain and looks after the receiving and placing of farm settlers, farm hands and domestic servants when they arrive in Ontario.

MANITOBA

BY GEORGE BATHO, EDITOR OF PUBLICATIONS

IN the province of Manitoba, agriculture and immigration are embodied in one department under the Hon. G. J. H. Malcolm as Minister. The Deputy Minister of the department is Mr. J. H. Evans, B.S.A.

In addition to the general work of organizing policies, drafting legislation, and supervising the whole work of the department, there attach directly to the offices of the Minister and the Deputy Minister some lines of detail administration. During 1920 these included such matters as direction of grasshopper destruction, purchase and distribution of feed and

supplies for needy districts, supervision of demonstration farms, promotion of agricultural trade, administration of Farm Implements Act and Produce Dealers' Act, and issuing of royalty coupons on furs.

Manitoba Agricultural College, Winnipeg, John Bracken, B.S.A., President. Regular Courses: In agriculture, a diploma course of three years and a degree course of five years; in home economics, a diploma course of two years, a course in institutional management of three years, and a degree course of five years. Special short courses on many phases of agriculture and home economics. Correspondence courses on many subjects. Experimental field plot work; seed testing; plant breeding; experiments in animal feeding, poultry, dairying, horticulture, physics; soil analysis, etc. Preparation of manuscripts for bulletins; correspondence on agriculture and home economics subjects; addresses at meetings, and other miscellaneous activities. Affiliated with the University of Manitoba, which grants the degrees both in agriculture and in household science.

Agricultural Extension Service, S. T. Newton, Director. Conducts short course schools at local points, demonstrates, conducts agricultural chatauquas; administers the Agricultural Society Act and the Home Economics Society Act; directs and assists in carrying on Boys' and Girls' Club work. Prepares and stages provincial exhibits both within the province and elsewhere. Supervises campaigns to destroy gophers, crows and farm pests. Directs the work of agricultural representatives. Maintains and circulates travelling libraries.

Dairy Branch, L. A. Gibson, Dairy Commissioner. Administers the Dairy Act. Assists in organizing and supervising creameries, cheese factories and skimming stations. Conducts provincial butter grading,

correspondence, instruction and general work along dairy lines.

Weeds Commission, S. A. Bedford, Geo. Walton, H. B. Brown, Commissioners. Administers the Noxious Weeds Act. Supervises municipal weed inspectors. Inspects seeds and seed grain, conducts meetings and carries on educational work.

Publications and Statistics Branch, Geo. Batho, Agricultural Editor. Edits, illustrates and supervises the printing and mailing of agricultural and home economics literature, departmental reports and other printing and advertising. Compiles agricultural statistics and crop reports.

Live Stock Branch, W. W. Fraser, Live Stock Commissioner. Administers several acts relating to the live stock industry; issues animal brands; assists farmers to stock farms with animals; handles the work for the Stallion Enrolment Board. One division under Mr. S. G. Sims devotes its entire energy to administering the Settlers' Purchase Act.

Game Branch, Miss A. Cole, Secretary. Issues game licenses and receives reports from holders thereof; issues permits for export of pelts. Supervises publications in connection with the Game Branch.

Employment Service of Canada, (Manitoba Branch), J. A. Bowman, Superintendent. The Employment Service of Canada is carried on under the joint auspices of the Dominion and provincial governments. The Manitoba Branch takes charge within the province of directing applicants for work to where it may be obtained and endeavours to find workers for such industries as are in need of employees.

SASKATCHEWAN

BY W. A. MACLEOD, EDITOR OF PUBLICATIONS

THE Department of Agriculture, Saskatchewan, headed by a Minister and Deputy Minister, is divided into six principal

branches. Following are the administrative officers: Minister, the Honourable C. M. Hamilton; Deputy Minister, F. H. Auld; Live Stock Commissioner, J. G. Robertson; Field Crop Commissioner, M. P. Tullis; Dairy Commissioner, P. E. Reed; Co-operative Organization and Markets Commissioner, J. F. Booth; Secretary and Acting Deputy, Statistics Branch, Edward Oliver; Chief Game Guardian, F. Bradshaw; Secretary, Organization Department, Miss Isabel Cummings.

Live Stock Branch.—The staff of the Live Stock Branch includes in addition to the Commissioner, one assistant, two veterinarians, and five buyers and inspectors. Under the head of distribution grade female cattle are purchased and distributed as are also sheep and hogs of improved breeding. Through the Live Stock Associations the Branch handles auction sales of all classes of live stock raised by farmers in the province. Representative specimens of such animals as are thus handled are collected and displayed at the larger exhibitions. The Branch also takes charge of the enrolment and licensing of stallions. With a view to the prevention of blackleg in cattle and hemorrhagic septicemia in horses, the Veterinary Division of the Branch supplies at cost preventive inoculation filtrates. The Brand Act is administered by this Branch which is also charged with such special duties as affording relief in the way of supplying feed to districts that have suffered from drought.

The Field Crops Branch.—The Commissioner directs the work of eighteen Field Representatives. This Branch exercises weed control; directs the gopher destruction campaign; distributes relief supplies of seed, and other requirements, to dried out areas; and makes exhibits representing the work of the Branch at the larger exhibitions.

Dairy Branch.—The Dairy Commissioner is assisted by a chief butter grader, two assistants, and three instructors. Butter grading stations are operated at Regina and Saskatoon. Dairy instruction cars are run from time to time on lines of railway. Dairy meetings are held. Instruction is given at cream buying stations and creameries and to producers and handlers in producing dairy products. The Branch co-operates with the Poultry Division of the University of Saskatchewan in extension work. Educational work is carried on in co-operation with the Saskatchewan Dairymen's Association. Creamery operators' and producers' competitions are managed, boys' and girls' judging competitions directed and dairy exhibits for the larger shows are organized.

Game Branch.—The staff of the Game Branch consists of a chief game guardian, an assistant game guardian, six salaried game guardians, 350 voluntary game guardians, and a provincial naturalist. The work comprises the administration of the "Game Act" and the "Useful Birds Act," the supervision of the provincial museum and educational work consisting of lectures on the preservation of useful wild life, and distribution of bulletins, posters, etc.

Bureau of Statistics Branch collects, compiles and publishes statistics of crops and live stock, and adjustments are made between debtors and creditors.

Co-operative Organization Branch.—This Branch gathers and disseminates information in regard to the organization and operation of crop producing, purchasing and marketing associations. Co-operative Associations organized in the province are registered. Special attention is given to encouraging co-operative live stock and wool marketing. Helpful bulletins are prepared and distributed.

ALBERTA

BY JAMES MCCAIG, M.A., EDITOR OF PUBLICATIONS

THE Department of Agriculture of Alberta is administered by Honourable Duncan Marshall, with Mr. H. A. Craig, B.S.A., as Deputy Minister; the Assistant Deputy Minister and Secretary of the Department is Mr. Z. McIlmoyle. The respective administrative officers and the work for which each is responsible are shown below:—

Provincial Dairy Commissioner, C. P. Marker, Calgary. The Dairy Commissioner assists by education, direction and inspection the total dairy interests of the province. He markets creamery butter consigned to him and grades all samples of either dairy or factory butter for producers.

The Live Stock Commissioner, S. G. Carlyle. The Live Stock Commissioner administers the Live Stock Encouragement Act and gives direction and assistance to the breeding and improvement of live stock in the province.

The Provincial Veterinarian, P. R. Talbot, V.S. The Provincial Veterinarian attends to the health of farm animals in the province by advice and direction where veterinary surgeons are not available, but not including animals suffering from contagious diseases. He also lectures in the Schools of Agriculture and at the University.

The Superintendent of Agricultural Schools and Demonstration Farms, A. E. Meyer, LL.B. The Superintendent of Agricultural Schools and Demonstration Farms directs the work of six agricultural schools and institutional farms attached to them as well as a number of other demonstration farms in the province.

Director of Demonstration Farms, D. Douglas. It is the business of the Director to supervise under the Superintendent the management of

the institutional farms attached to the schools and also the other demonstration farms of the provincial Department of Agriculture.

Superintendent of Seed and Weed Branch, J. D. Smith. The Superintendent of the Seed and Weed Branch administers the Noxious Weed Act, encourages the production and exchange of pure seed, conducts field grain competitions and assists in the moving and marketing of feed and seed products.

Crop Reporter and Statistician, J. McCaig. It is the duty of this office to issue within the crop season semi-monthly reports of conditions relating to farm operations, crops and live stock, and to co-operate with the Dominion Department of Agriculture in the issue of final annual crop and live stock figures.

The Poultry Commissioner, J. H. Hare. The Poultry Commissioner encourages the production of poultry and eggs, organizes associations for marketing and conducts grading stations for the marketing of consigned eggs and poultry.

The Superintendent of Fairs and Institutes, A. Galbraith. The work of this office is concerned with the direction and encouragement of agricultural fairs and exhibitions and of affording financial assistance. The Superintendent also conducts demonstration trains, short course schools, institutes and excursions.

The Superintendent of Women's Institutes, Miss Mary MacIsaacs. It is the work of this branch to organize and conduct institutes, to arrange and carry out courses of lectures and demonstrations and to organize and direct the work of nine girls' clubs throughout the province.

The Provincial Game Guardian, B. Lawton. The Provincial Game Guardian administers the game laws of the province. He is also fire guardian.

Recorder of Brands, J. Wilson. It is the duty of this officer to allot and record brands and to register transfers.

Publicity Commissioner and Editor of Publications, J. McCaig. It is the business of this office to furnish information with respect to the agricultural and other resources and opportunities in the province and to edit and distribute agricultural and other publications.

BRITISH COLUMBIA

BY W. J. BONAVIA, SECRETARY, DEPARTMENT OF AGRICULTURE

WHILST "Agriculture" has been included in the portfolio of the Minister of Finance and Agriculture for the Province of British Columbia since the year 1873, noticeable activities were not shown until 1891 under the administration of the Hon. J. H. Turner, who was subsequently for so many years the Agent General for British Columbia in London, England.

For a long period the staff of the department was small, being mainly concerned with the collection of Agricultural Statistics. In 1897 the Farmers' Institute movement was organized, but it was not until 1903 under the administration of the Hon. R. G. Tatlow, that a more progressive policy was evident.

In 1909-10 the Department was organized into the following three branches, Live Stock, Dairying and Farmers' Institutes, Fruit and Poultry, with a permanent staff of thirteen men. From that date the growth of the Department has been steady.

In the year 1916 the portfolios of Finance and Agriculture were separated, the agricultural industry being thus represented by a Cabinet Minister and the Department put on an equal basis with other Government departments.

For the purposes of administration the work of the Department is under the charge of a Deputy Minister with heads of branches who are directly responsible to him. At present the Minister of the Department is the Honourable E. D. Barrow; the Deputy Minister, Dr. David Warnock; and the Secretary Mr. W. J. Bonavia.

The office of the Deputy Minister takes charge of all work that is not directly handled by special branches of the Department. Linked with the Department are 159 Farmers' Institutes with 6,290 members, and 75 Women's Institutes with 2,753 members. Lectures and demonstrations are arranged and a considerable volume of routine work attended to in the shape of reports of meetings, list of members, etc.

Horticultural Branch, Provincial Horticulturist (vacant). This Branch maintains offices at seven centres of the fruit growing industry where instruction and demonstration are given in modern methods of pruning and cultivation, controlling insect pests and diseases, enforcing spraying regulations, conducting packing schools, and dealing with such other numerous problems as arise in relation to the fruit growing industry. The Branch has taken over a plot of six acres at Gordon Head to demonstrate the possibility of building up impoverished soil and dealing with other important questions. A section of orchard land has been put under codling moth control where various systems of control are demonstrated. The Branch maintains an effective system of nursery inspection.

Live Stock Branch.—Live Stock Branch Commissioner, W. D. McDonald. The activities of the Live Stock Branch are varied and include in addition to matters concerned directly with the live stock industry, the poultry industry, as well as soils and crops. A veterinary officer investigates plant poisoning,

carries out instructions with relation to the health of farm stock, more particularly with regard to the health of dairy herds. The Branch conducts the Provincial Egg-Laying Contest; Boys' and Girls' Competitions; administers the Egg Markets' Act; conducts Poultry Inspection and Instruction; Co-operative Sales of Live Stock; Co-operative Marketing of Wool; directs two Dry-farm Experimental Stations; demonstrates correct silo construction; inspects and records live stock brands; and under soil and crop work conducts experiments in tile drainage, manuring crop rotations, potato inspection, etc.

The Dairy Branch.—Dairy Commissioner, Henry Rive. The Dairy Branch directs the work of six Cow Testing Associations; administers the Dairy Regulations Act; and operates two Government Creameries.

Branch for Inspection and Fumigation of Imported Fruit, Nursery Stock, etc.—The duty of this Branch is the inspection of horticultural and field products imported into British Columbia, and to other parts of the Dominion via British Columbia ports, for the purpose of preventing the entry of any injurious insect pests or diseases. Importations requiring such treatment are fumigated and if necessary destroyed or shipped out of the country.

Entomology and Plant Pathology Branch.—J. W. Eastham, Plant Pathologist. In this Branch investigations have been made into the Yellow Rust of Raspberries, Bacterial Blight of Walnuts, Western Tomato blight, and other diseases and experiments tried for their control. By an agreement with the Dominion Department of Agriculture the provincial laboratory at Vernon is under the direction of an official of the Dominion Entomological Branch. Here the life-history and control methods with respect to the onion maggot, cabbage-root maggot and other insects are investigated.

Statistics Branch.—The Statistics Branch co-operates with the Dominion Bureau of Statistics in the taking of a postal census every year. Additional data are secured through a crop correspondent monthly from July to December. This year a personal canvass has been made of the lower Fraser Valley to secure exact figures on small fruit acreage, etc.

Markets Branch.—The Markets Branch maintains a Commissioner for the Prairie Provinces at Calgary, and a Coast Markets Commissioner at Vancouver. The Markets Commissioner issues reports on the fruit consumption of prairie towns and obtains lists of retailers. The Eastern Canadian and United States points are also similarly covered. By a system of publicity the several consuming districts are kept informed

with regard to British Columbia fruits. The Vancouver Branch endeavours to stimulate the sale of British Columbia fruit in coast markets. This Branch also specializes in the inspection of fruit for export.

Apiary Inspection Branch.—Seasonal Bee inspection work is carried on under the supervision of the Foul Brood Bees Act of 1911, subsequently amended. Since 1914, four district inspectors have been employed giving instruction in up-to-date methods of bee keeping and combatting foul brood.

Publications Branch.—J. Roy McLennan, Editor and Chief. The Publications Branch distributes bulletins and circulars and edits and distributes the "Agricultural Journal," published monthly.

NOVA SCOTIA

A SUCCESSFUL COMMUNITY HALL

AN example of a successful community hall in which the whole community takes pride and interest is afforded by the so-called Agricultural Demonstration Building at Lawrencetown, N.S. It is claimed that nowhere in Canada will there be found a more flourishing hall of its kind or one that is better fitted for the purposes for which it is intended. The community hall as an institution which is strongly advocated by every authority on rural advancement, and particulars in regard to the hall in question, its history and its functions are narrated with the hope that elsewhere similar undertakings may be encouraged.

Lawrencetown is an attractive village of 600 inhabitants, situated in the midst of the Annapolis Valley, famed for its orchards and comfortable farm homes. Its interests are purely agricultural;

every resident is dependent on the farming industry, and is influenced directly by the prosperity of those engaged in farming.

In the summer of 1913 the people of Lawrencetown determined to have a community hall. To the continued efforts of Dr. J. B. Hall, a local resident, this decision may be chiefly attributed. Dr. Hall, formerly a member of the staff of the Provincial Normal College, now retired, has during his whole career been deeply interested in education and social advancement, and his initiative led to the development of public opinion in favour of a building suitable for educational and community purposes with which might be combined athletic grounds for the promotion of such sports as baseball, football, skating, etc. The decision reached led to a conference between the Secretary for Agriculture,

THE AGRICULTURAL GAZETTE OF CANADA

Dr. Cumming, and a number of leading residents, at which the County Farmers' Association was represented. A subscription list was opened up. The County Council made a contribution, and the Department of Agriculture provided, out of the Agricultural Instruction grant, sufficient funds to bring the total up to the sum of about \$4,000. This was enough at that time to provide for the purchase of land and erect a suitable building, but not to provide furnishings.

agriculture. Plans had not proceeded very far before it was found that owing to the prevailing lack of accommodation for such gatherings very little was likely to be accomplished. This led to the decision to offer some financial assistance to communities that would themselves contribute to the cost of providing a building suitable for such activities as short courses in agriculture and household science, Women's Institute gatherings, meetings of farmers' societies and associations, farmers' dinners, school



COMMUNITY HALL, LAWRENCETOWN, NOVA SCOTIA

The reason that led to the adoption of the policy of assisting communities to provide accommodation of this kind from Agricultural Instruction moneys will be understood when the situation that confronted agricultural extension work in the province is set forth. Following the granting of funds by the Dominion for expenditure by the provinces on agricultural instruction and education, the province of Nova Scotia arranged for a series of short courses in

fairs, public lectures, a public library and other activities of a similar nature. The result was that seven communities took advantage of the policy. The scheme of the Lawrencetown community and the associated farmers of Annapolis county was the only one that embraced any wide range of activities apart from short courses.

The building was opened by a short course in agriculture in February, 1914, which was attended by over 300 farmers.

The building is a one-story structure, the main features being an assembly hall seating 250 people, and an arena planned as a live-stock judging pavilion, but also adapted to any purpose for which an auditorium might be used, such as lectures, motion pictures and any other occasion for which the assembly hall did not afford sufficient accommodation.

The assembly hall is finished in hard-wood, and is furnished with platform, blackboards, an open fireplace, electric light, telephone, and stoves for cooking and heating. Two small apartments adjoining the hall are available for office and committee purposes. The additional furnishings necessary to complete the usefulness and attractiveness of the building were provided by the men and women interested. The money for the purchase of a piano was raised by social functions held by the women. Chairs, tables and other furnishings were also provided, many individuals making contributions. It is likely that in the near future a motion picture machine will be added to the equipment.

The library consists of about 1,000 volumes, the weekly issue being from

two to three hundred volumes. On the occasions when short courses were held, the arena was used for live stock judging and machinery demonstrations, while the assembly hall was used for seed judging classes, general lectures and household science demonstrations. On two occasions a county poultry show was held in the arena. In addition to this, the building is used for all public functions, and on such occasions the women of the community have usually provided refreshments.

The grounds adjoining the hall have also been made full use of for athletic games, a feature that is fully appreciated by the younger element.

Those responsible for the undertaking have in view an ever extending field of usefulness, but the development of these ideals is still in the future and will need time and persistent effort for their accomplishment. It may justly be claimed, however, that the results already achieved have more than justified every effort that has hitherto been made and augur well for future growth and development.

QUEBEC

HORSES IMPORTED FOR STOCK IMPROVEMENT

IN continuance of the policy of the Department of Agriculture of Quebec to assist in the improvement of the horse stock of the province, a further consignment of Percheron horses has been brought into the province for sale to individuals, agricultural societies, or breeding syndicates. The shipment consists of nine Percheron stallions, nine Percheron mares, one Belgian stallion and one Belgian mare. The horses range in age from two to five years. The valuation put upon the horses is set at from \$900 to \$2,500 for stallions and from \$500 to \$800 for mares. The horses were purchased in

the United States by representatives of the Federal and Provincial Departments of Agriculture.

SPECIAL GRANT FOR CLOVER HULLERS

To encourage the growing of clover and more especially for the production of seed in the province of Quebec, a special grant has been provided by the provincial Department of Agriculture for the use of agricultural societies, farmers' clubs, and other agricultural associations numbering at least twenty farmers to assist them in the purchase of clover hullers. The grant amounts to

10 per cent of the cost of machines purchased at from \$500 to \$1,000, and 15 per cent of the cost of machines costing more than \$1,000. The maximum grant to a society is fixed at \$200. This grant is available for machines purchased before the 1st of May, 1921, and applies only on the first huller bought in a parish.

THE PRODUCTION OF CLOVER FOR SEED

BY ARMAND LETOURNEAU, B.S.A., JOURNAL OF AGRICULTURE

Growing clover for seed has developed rapidly in the province of Quebec.

During 1919, 975,220 lbs. of clover seed were harvested in the province; the crop of 1920 will be still larger. The total for 1919 (975,220 lbs.) shows an increase of 644,992 lbs. over that of 1918. Had it not been for the very poor weather conditions of last fall, the yield would certainly have been over a million pounds. There are now hundreds of farmers who grow clover seed, not for sale, but for their own supply. A fact also worthy of record is that the quality of the seed is greatly improving.

Sixty-five new clover hullers were sold in our province during the year 1919. Most of these purchases were made by farmers' clubs or agricultural co-operative associations. A rebate of fifteen per cent of the purchase price was granted by the provincial department during 1919. The department having granted this year a special bonus of \$75 to the agricultural associations, twenty clover growing competitions were organized in which 424 competitors participated. The clover hullers placed free of charge at the disposal of the farmers in localities where clover was just beginning to be grown, have threshed, during the fall and the winter, 93,854 lbs. of clover seed. These machines stopped in 36

villages and clover was brought to them for threshing by 572 farmers.

COW TESTING

BY ALEX. DION, DAIRY DIVISION

Recognizing the advantages of cow testing, the Minister of Agriculture for the province of Quebec organized a whole month's campaign on this work last spring, in which all inspectors of butter and cheese factories and all county agronomists (agricultural representatives) of the department took part.

The seed scattered by these officials fell upon good soil, and over 30,000 cows were entered by the more progressive farmers of the province. Unfortunately, on account of the scarcity of bottles, acid and scales, resulting from the great demand for these articles, a large proportion of the orders could not be filled, and thus a great many were deprived of the advantage of making individual tests of their cows. All intend to purchase the necessary outfit next spring, however, and make a start in this work, so necessary for those who seriously desire to improve their herds.

In spite of this delay, there are actually 16,000 dairy cows under test in the province of Quebec, out of 24,000 entered in the whole of Canada; that is to say two-thirds out of the total number of cows under test in the Dominion in 1920 belong to the province of Quebec.

There is cause for congratulating our farmers who have once more shown what they can do, that they are never behind in progressive undertakings and never fail to join in all the campaigns launched in their interest by the Minister of Agriculture. Let those who have benefited from cow-testing this year continue to ascertain closely the yield of each of their cows, and before long they will reap greater profits not only through an

increase in the yield of milk, but also through better selection of breeding animals.

There is no doubt that those who have not as yet adopted cow testing will hasten to do so when they see

the results obtained by their neighbours and the profits derived from perseverance and intelligent work. Cow testing is the only way to get rid of the boarders—the cows that eat up the profit of a herd.

ONTARIO

NEW APICULTURAL BUILDING

THE new apicultural building at the Ontario Agricultural College was formally opened by the Hon. M. W. Doherty, Minister of Agriculture, at the time of the annual convention of the Ontario Beekeepers' Association.

The building is sixty-four feet six inches by forty-seven feet three inches.

on the inside with inch boards on the two by fours, two layers of insulating paper with a two-inch cork board, and finished with a quarter of an inch of Portland cement. There is a false ceiling six feet from the ground finished exactly the same as the other walls. The outlet at the top corner is



APICULTURAL BUILDING, AGRICULTURAL COLLEGE, GUELPH, ONTARIO

The basement comprises a honey and wax room with steam heat, water, gas, electricity, a dark room, stock room, bench room, lavatory, and a bee-cellar. The details of the bee-cellar are fourteen feet two inches by sixteen feet, walls eighteen inches thick, water-proofed on both sides, two by fours nailed on ends

connected with the ventilating shaft of the whole building and is controllable. A small inlet in the lower corner near the entrance is also controllable. The floor of the cellar is cement. An elevator in the corner of the basement runs up to the lecture room and also a bench room twenty-six feet by sixteen feet for

practical work in assembling supplies. Under the front stairs there is a natural fumigating room.

On the main floor in the front are a microscopic laboratory, small office, and a reading room, together with the general office, the apiarist's office, which includes a fire-proof vault for the keeping of records.

The top floor contains a lecture room to seat about two hundred and fifty, seats arranged in semi-circular rows rising at the back to five feet from the floor level. The lecture room will be complete with balopticon, enclosed blinds, sliding blackboard, desk, and observation colonies at the windows for use at class work.

The building is finished in tapestry brick and cost approximately \$60,000.

REPORT OF THE KEMPTVILLE AGRICULTURAL SCHOOL, 1920

BY W. J. BELL, B.S.A., PRINCIPAL

The School

The buildings, necessary to open the Kemptville Agricultural School to students desiring to avail themselves of the opportunity of securing practical instruction and training in agriculture, have been completed and also furnished with the most modern equipment available. Work was completed during the past summer on the Main School and the Farm Mechanics buildings. The Main School building is three stories, 120 feet by 61 feet and solid brick. It contains office accommodation for the staff, as well as class rooms and laboratories for instruction in agriculture and household science. The Mechanics building, 80 feet by 50 feet, is brick veneered, and is arranged for demonstration and practice on gas engines, tractors, farm machinery, blacksmithing, including horse-shoeing, carpentry and cement work. These two buildings, with the Live Stock pavilion, also containing the gymnasium, furnish excellent accommodation for conducting

a two-year course in agriculture, a course designed for young men and women who intend going back to the farm on completion of their studies.

The following instructors have already been appointed to the staff: L. G. Heimpel, B.S.A. (Farm Mechanics and Drainage); E. K. Hampson, B.S.A. (Field Husbandry and Science); and A. J. Logsdail, B.S.A. (Horticulture, Entomology and Botany). As the course progresses other instructors will be added to the staff.

The school's regular course commenced October 25, with an attendance of twenty-two young farmers, an attendance which will be considerably increased when the winter term begins.

The following short courses were conducted at the school during the winter of 1920:—

Herdsmen's course, (five weeks); Farm Power (two weeks); and Household Science (four weeks). There was an aggregate attendance at the three courses of 358, and this would have been considerably increased but for an outbreak of small-pox and influenza during the progress of the Herdsmen's and Farm Power courses.

The Farm

A three-year rotation is employed on the farm, and this, coupled with thorough cultivation and a most favorable season, resulted in excellent yields of all field crops except roots. All cereals grown on the farm were from First Generation Registered Seed, which will be cleaned ready for the seeder and sold at reasonable rates to farmers of Eastern Ontario in quantities sufficient to seed five acres. The varieties of grains used were Banner oats, Arthur peas, O.A.C. No. 21 barley and Huron wheat. The ensilage corns grown were Golden Flow, White Cap Yellow Dent and Longfellow, the first-named variety giving the best results during the past season. Sweet clover was again used as the main pasture crop for dairy cattle and, as in 1919, gave excellent results. That

seeded in 1919 was pastured until June 25, 1920, and then left for seed. It was cut with a reaper with a minimum of shelling. Early pasturing prevented the plants from becoming unnecessarily tall and made them much more branching. Giant White Mangel has given excellent results on the School farm. A mixture of 8 pounds red clover, 4 pounds alfalfa, 4 pounds timothy and 2 pounds alsike per acre gave best results as a hay crop during the past year. Alfalfa sown 22 pounds to the acre has given good results, with practically no winter killing during the past two years. Ontario grown alfalfa seed was used exclusively.

A farm containing ninety acres was added to the two-hundred acre School farm last spring. A large house on this farm has been divided to make two comfortable houses for farm help.

Live Stock

Good results have been secured during the past year with the herds and flocks on the farm. The increase in young stock has been encouraging. Many of the Holstein and Ayrshire cows and heifers are making creditable and profitable official yields, while the health of all stock has been excellent.

ONTARIO CO-OPERATIVE MARKETING

United Farmers

Co-operative marketing has expanded rapidly in the province of Ontario under the direction of the United Farmers' Co-operative Company. Whereas the turn-over of business in 1919 was \$8,500,000, the amount for 1920 approaches \$20,000,000. This amount of business includes the transactions at seven co-operative stores. Expansion has been chiefly with poultry products and live stock. During the year the egg and poultry department marketed eggs and poultry to the value of \$600,-

000. The Toronto Creamery's turnover was \$380,000. These products were paid for on the basis of quality arrived at by thorough inspection methods. The live stock turn-over amounted to almost \$11,000,000 at the Union Stock Yards, Toronto, and about \$795,000 at the Montreal Stock Yards where branches have been established.

Brant County

In Brant the idea of co-operation and co-operative marketing has a firm hold on the people. As clubs are organized in practically very part of the county a great deal of the live stock is marketed that way. Although cattle and sheep are sold co-operatively to a large extent, pigs are more generally sold co-operatively. The Canadian Packing Company's plant being situated at Brantford, arrangements have been made whereby Toronto prices, less freight, are paid to all club members. Probably sixty per cent of all the pigs are sold in that way. The apples are sold either by a few groups of growers or by the Brant Fruit Growers' Association. Owing to the war the membership has dwindled down so that they will handle only about fifteen hundred barrels this season. The crop on a large number of good orchards has been purchased on the tree, owing to the scarcity of help.

Bruce County

The live stock industry in Bruce county is a most important feature of co-operation. Market stock goes out through co-operative channels from practically every station in the county. In many cases one man ships for four or five clubs and probably 60 per cent of all the cattle and hogs that are sent from Bruce are marketed through the co-operative shippers.

Lincoln County

During the past season the U. F. O. Co-operative Company arranged to handle the peach crop for the various clubs through an extensive advertising campaign and through the instrumentality of travelling salesmen. The season was exceedingly difficult from a beginner's point of view, owing to very heavy crops, the scarcity of cars, the difficulty of obtaining suitable containers and the sudden heat wave which brought all the Elbertas on at once throughout the entire peach belt. Notwithstanding these difficulties the organization made a creditable beginning which will enable them to carry on a more extensive business another year.

The Niagara Grape Growers, Ltd., with headquarters at St. Catharines, has been of untold value to the grape-growers of the entire grape-growing district. Their output up to the middle of October was about one hundred and fifty car-lots all of which have gone out of the country thus making the price at home far more steady and more remunerative. The standing of the organization is now of the best and will enable it to do far better next year. The proportion of the crop handled will run from sixty to seventy-five per cent.

Rainy River District

A group of farmers in the Rainy River District has received a charter for the Rainy River Co-operative Seed Growers' Company Ltd. This company was formed primarily for the purpose of installing a re-cleaning plant for the cleaning and grading of clover seed. The company contemplate, however, the handling of all classes of seed including grains and potatoes. The company is formed on a capital share basis. It will have an authorized capital of \$5,000 divided

into 200 shares of \$25 each. Shareholders are required to pay one-half of the amount of the subscription when purchasing the stock and the balance at the call of the directors.

Renfrew County

In this county we have organized a co-operative association for the marketing of farm crops and live stock and for purchasing for farmers' needs. The association will be known as the Renfrew County Co-operative Ltd. A charter has already been secured. The association will market eggs, poultry, and other produce, and will buy machinery and other farm requirements. The association is being financed by the promissory note system; notes given by members of \$50 each will be placed in the bank as collateral.

Dundas County

Co-operative marketing in Dundas is moving forward quite rapidly. The largest co-operative organization is the branch of the United Farmers' Co-operative Company, located at Morrisburg, which, before being taken over by the United Farmers' Co-operative Company, was known as the Dundas Co-operative Association. In connection with this association there is a cold storage, which has a capacity of 250,000 dozen of eggs and 3,000 cheese. The eggs and cheese are bought and paid for at the ruling prices and when sold the dividends which are over and above the price paid, come back to the producer, after deducting the selling expenses. This is the only branch in Greater Dundas which has cold storage facilities. Live stock, however, are shipped co-operatively from Aultsville, Wales, Finch, Chesterville and Mount-ain, as well as Morrisburg. Whether shipping is done weekly or every two weeks depends upon the quantity of

cattle and hogs available. These shipping points are branches of the U. F. O. clubs.

Eggs handled through the Morrisburg cold storage are gathered by truck from almost all parts of the county. These are called for twice weekly during the warm weather. In the cool weather when the egg production is falling off, gathering once a week is sufficient. Many of the eggs are exported to Great Britain.

The cheese marketed through the association is also handled on the profit sharing basis. Not all the factories, by any means, sell co-operatively. It remains optional with the salesmen and patrons whether they market through the co-operative organization or not.

Under able management co-operative marketing has developed steadily for several years, but with the improvement of roads, and consequently the greater use of motor trucks co-operative marketing has gone forward at a much more satisfactory rate. This is especially true during the year just closed.

Norfolk County

Two co-operative marketing associations are doing business in Norfolk county. These are the Norfolk Co-operative Association and the Norfolk Fruit Growers' Association. While these are separate associations they are managed by the same officer.

The Norfolk Co-operative Association serves about two hundred members as well as a large number of non-members by selling their produce, such as grain, potatoes and other vegetables, maple syrup, clover seed and lesser commodities. This society also purchases for its members supplies of such goods as mill feeds, corn, wire fencing, binder twine, salt, flour, sugar, fertilizers, etc. The largest amount of business is done in

mill feeds, potatoes and sugar. For example, about eight car-load of kiln dried corn were brought in. The first year of organization, 1918, the business transacted amounted to \$90,000; in 1919 it was \$141,000. It is expected that the turnover last year will exceed \$240,000.

The Norfolk Fruit Growers' Association in 1919 sold 16,000 barrels of apples for approximately \$90,000. In 1920 the business increased by about 9,000 barrels. The apple market situation is so difficult in 1920 that growers are unable to dispose of their stock unless through the association, even the canning factories closing down or running on short shift.

Notwithstanding the market difficulties the Norfolk Fruit Growers' Association have been able to sell practically the whole pack at fair prices. One of the great advantages secured by the association was the contracting ahead for barrels, by which a saving of from 50c. to \$1 per barrel was effected.

Oxford County

Considerable progress has been made in the marketing of live stock, eggs and poultry. Until 1920, very little live stock was shipped by the U.F.O. Clubs on a co-operative basis. That year, several of the clubs started shipping, with very satisfactory results. Not only were higher prices received, but those who had good stock to sell received the highest price, while those with inferior stuff had to be content with a lower market. Because of the fact that live stock has been sold on this graded basis, farmers can see the advantage of producing high grade stuff. Each of the clubs now shipping has found it exceedingly difficult to organize for co-operative shipping of live stock, but when once started has been keeping it up.

Farmers generally who have shipped their own live stock realize what they have lost by not taking more interest in the marketing of live stock in years gone by.

In connection with the poultry business, some of the largest egg circles in the province are now found in Oxford county. A large percentage of the eggs from the circles was sold to the United Farmers' Co-operative Co. at Toronto, and very few places in the province pay a higher price for eggs than is paid in this district. The organization of these egg circles is not only improving the quality of the eggs offered for sale, but is also stimulating both summer and winter production. People are naturally taking better care of their birds, and making the poultry a profitable part of the farm business. In this connection perhaps the most progress was made this year in systematically culling the farm flocks, with the idea of getting rid of boarders. An account of this culling work was described by Professor Graham in *The Agricultural Gazette* for October on page 817. It might be added to what Professor Graham said that, as a result of this work, several applications are on hand for the work to be taken up in three other districts. Even in the latter part of October some of the boys who helped in the culling work were still continuing to cull flocks at the request of farmers who have learned the advantage of having it done. It is therefore evident that a decided movement is on foot for a systematic improvement of the poultry of the county.

Victoria County

In the county of Victoria the majority of the hogs in particular are marketed co-operatively. No new shipping centres have been

organized during the past year but the organization in Mariposa township has made considerable advance. The continued opposition of the local drovers led to better organization on the part of the co-operators who have got their members to realize that the only way in which they can hope to succeed is to stick to co-operation even though prices may at times be lower than those offered by the drovers.

Through the Cambray Egg Circle large quantities of eggs, poultry and butter are shipped co-operatively.

Frontenac County

Nineteen United Farmers' Clubs are shipping hogs and cattle to market from Frontenac county. The Harrow-smith club is the largest shipper. This club ships an average of a carload of hogs a week, and has shipped about three carloads of cattle during the season. Other clubs have shipped smaller quantities. One of the clubs since August has been shipping eggs co-operatively. The eggs are selected on the case plan system of identification: that is, members bring their eggs to the collector who packs them in cases and ships them to Toronto or such other points as directed. The marketing is done through the Poultry Division of the United Farmers' Co-operative Company at Toronto. This company returns the checks for their eggs to the members.

POWER FARMING

BY W. C. BLACKWOOD, B.A., SC., PROFESSOR
OF PHYSICS

The Physics department of the Ontario Agricultural College, by correspondence with more than two hundred farmers who are using tractors, has ascertained facts relative to the comparative value of horse-power and other forms of power on the Ontario farm.

The statements are not based on information received where answers to questions differed respecting the relative merits of horse and tractor power, or where the efficiency of the tractor for any phase of farm work was questioned.

1. Most farmers agreed that horse-breeding was slightly on the decrease, but thought that other factors rather than the advent of the tractor were responsible for the decrease.

2. Tractors in large numbers have been used for so short a time that there has not been an opportunity of investigating the effect tractors will ultimately have on the number of horses on the farm.

3. The only horses that have been displaced are those kept for peak load during the spring months.

4. Total horses disposed of in 17 counties on 92 farms, from which returns were received, was 169, about 2 horses per tractor.

5. Many have not as yet disposed of their horses, as they are holding them for better prices. There will, therefore, in the near future be an

increase in the number of horses displaced by the tractor owners from whom information has been received.

6. As to economy, 54 out of 92 considered their tractor a profitable investment, 32 did not know, and 6 replied in the negative. The farmer in most cases had not kept strict enough account of the cost of each horse per year to be able to give a definite answer as to the economy of the tractor relative to the horse.

7. Improved work with the tractor seems to be a significant factor.

8. So far as the replacing of "horse" power by electrical power is concerned, there is as yet no available information which would lead one to believe that the influx of electrical power has had any marked effect on the horse problem on the farm.

9. Electrical systems are proving exceptionally efficient and are gaining in favour every day, according to reports received by the department. In electrical systems we include both hydro light and power, and gas electric systems.

MANITOBA

CONFERENCE OF AGRONOMISTS

A CONFERENCE of Manitoba Agronomists was held at the Manitoba Agricultural College on November 5 and 6, 1920. The purpose of the conference was to arrive at some definite conclusions as to the advice to be given to farmers in the different districts of the province in reference to crops, varieties, cultivation practices, rotations, etc.

The province was divided into three agronomic zones, i.e., Eastern, South-western and Northwestern. In each of these sections the agronomic problems were different but it was not possible

to definitely define these districts at the present time. The Eastern section or the Red River Valley was described as that portion occupying the basin of old glacial Lake Agassiz, and is approximately that portion of the province lying between the 96th and 98th meridians, and south of the 51st degree of latitude. The Southwestern and Northwestern sections are west of the 98th meridian, and separated approximately by the 50th degree of latitude.

It was agreed that this conference recommend the following varieties of grains, etc., in the order numbered,

THE AGRICULTURAL GAZETTE OF CANADA

those listed under No. 4 to be discouraged.

WHEAT	
<i>Eastern—</i>	
1. Marquis	4. Red Fife
2. Ruby	Red Bobs
3. Kitchener	Prelude
	Pioneer
<i>Southwestern—</i>	
1. Marquis	4. Ruby
2. Red Fife	Red Bobs
3. Kitchener	Prelude
	Pioneer
	Early Red Fife
<i>Northwestern—</i>	
1. Ruby	2. Kitchener
Marquis	Prelude
	Red Fife
	Pioneer

NOTE.—The recommending of Ruby and Marquis in No. 1 will depend on the particular location and danger from frost.

For all three districts where Durum is to be grown Kubanka is the variety recommended.

The following resolution was passed unanimously in reference to Durum wheat.—

"That this Conference recognizes that Durum wheat has greater resistance to rust and drouth than Marquis and that under certain conditions will outyield it. We would, however, point out that owing to its poor milling value, the market for it is very uncertain and that its effect on the export wheat trade with Great Britain might be prejudicial to the interests of Canada. We would, therefore, deprecate any great or sudden increase in the acreage devoted to this crop and would suggest that it be grown only where it is demonstrated that suitable red spring wheats cannot be profitably produced."

OATS

The oat varieties recommended for the different districts are:—

<i>Eastern—</i>	<i>Southwestern—</i>
1. Victory	1. Banner
2. Banner	2. Victory
<i>Northwestern—</i>	
1. Banner	4. Daubeney
2. Victory	5. Sixty Day
3. Gold Rain	

NOTE.—Our recommendations are based on knowledge of immediate conditions and quality of oats not based on tests.

In the Northwest District, Daubeney and Sixty Day are recommended only as early oats to be sown on late spring ploughing.

BARLEY

<i>Eastern—</i>	<i>Northwestern—</i>
1. O.A.C. 21	1. O.A.C. 21
2. Manchurian	2. Manchurian
<i>Southwestern—</i>	3. Canadian
1. Manchurian	Thorpe
2. O.A.C. 21	Two Rowed
	Variety, 1.
	Thorpe

NOTE.—As Manchurian and Mensury are practically the same variety, it was recommended that Mensury be dropped and only Manchurian carried.

RYE

North Dakota No. 959 is recommended as the best variety of rye for all districts.

FLAX

<i>Eastern—</i>	<i>Northwestern—</i>
Premost	Premost
N. Dak. R. No. 52	N. Dak. R. No. 52
N. Dak. R. No. 73	
<i>Southwestern—</i>	
Premost	
N. Dak. R. No. 52	

GRASSES.

<i>Eastern—</i>	<i>Pasture</i>
<i>Hay</i>	
1. Timothy	1. Brome
2. Western Rye	2. Meadow Fescue
3. Brome	3. Timothy
4. Meadow Fescue	4. Western Rye
(very promising)	
<i>Southwestern—</i>	
1. Western Rye or Brome	1. Brome
2. Timothy	2. Western Rye
	3. Timothy
<i>Northwestern—</i>	
1. Timothy	1. Brome
2. Western Rye	2. Meadow Fescue
3. Brome	3. Timothy
4. Meadow Fescue	4. Western Rye

LEGUMES

<i>Eastern—</i>	2. Red Clover
1. Alfalfa	3. Sweet Clover
<i>Southwestern—</i>	Sweet Clover or Alfalfa
(depending on soil conditions).	

NOTE.—Where alfalfa cannot be grown it recommended to sow Sweet Clover.

<i>Northwestern—</i>	3. Red Clover
1. Alfalfa	4. Alsike
2. Sweet Clover	

SUNFLOWERS

Where corn is not a success the growing of sunflowers is advocated. In the eastern district corn is a success—not an unqualified success but usually we get enough to fill the silos. Wheat does not do so well after sunflowers as after corn, but evidence goes to show that sunflowers can be grown as a succulent winter feed where corn cannot be grown.

ASSISTANCE TO FIRE SUFFERERS

IN August, fires occurred in a number of the newer settlements in Manitoba, mostly in those areas surrounding lakes Winnipeg and Manitoba. In these areas there is a mixture of timber land and prairie, alternating in some cases with moss-bottomed meadows which produce considerable quantities of wild hay.

For about three or four weeks the fires were burning continuously, the country at that time being very dry.

In order to have detailed information, the Department of Agriculture sent out ten special inspectors, who visited all the areas reported to be burned over, and collected a great deal of information as to the extent of the losses.

In several cases the settlers were returned soldiers. It was found that while the monetary loss was relatively not very great the amount of individual inconvenience was considerable, and the area swept over was

large. Much of the damage was done to pasture and to hay—both cut and uncut—and in some cases the settler found it difficult to care for his cattle; the fire had upset all his arrangements. In some instances, homes were destroyed.

After the returns were in, Mr. J. H. Evans, Deputy Minister of Agriculture, held a conference with the reeves and secretary-treasurers of the municipalities involved, and it was agreed that in all cases where the losers were situated in municipalities the assistance should be administered through the municipal offices, the Provincial Government assuming one-half the expense, and the municipality the other half. In unorganized territory the Provincial Government is assuming the whole expense and administering the assistance direct.

The general principle being followed is that the assistance is not being supplied in money form, but rather in the way of replacement of property destroyed.

SASKATCHEWAN

THE INTERPROVINCIAL WEED SPECIAL

BY F. H. AULD, DEPUTY MINISTER OF AGRICULTURE

ARRANGEMENTS have been made for operating a special train to be known as the Inter-provincial Weed Special over the Canadian Pacific Railway main line and branches to the south in the three prairie provinces.

The purpose of the train is to compel the realization of the seriousness of the weed situation; to inspire the individual farmer to the greatest possible use of the remedies available; to bring about a united effort by all farmers; to secure the co-operation and completest effort

on the part of the municipalities in dealing justly with the farmers who refuse to recognize the seriousness of the weed problem, and of dealing promptly and fairly with owners of vacant lands which are weed infested. The movement is expected to initiate and develop a policy of maintaining in grass as much as possible of the road allowance.

The train will run for six weeks, commencing on the 24th of January; both morning and afternoon meetings will be held. The train will be made up of five cars, which will include two lecture cars, fitted with platform and

table, one exhibits car, one standard sleeper and one dining car. The exhibits car will include a display of growing weeds and such other material as may be regarded as suitable by a committee consisting of the chiefs of the weed branch in each of the three provinces. The staff accompanying the train will include one representative

from each province throughout the trip, a representative of the federal Department of Agriculture, with such assistants as are needed to carry out the programme that will be arranged. The train will be thoroughly advertised through the press and by conspicuous posters freely distributed throughout the territory to be covered.

AGRICULTURAL INSTRUCTION NOTES

NOVA SCOTIA

PARTICULARS of rural science work in Nova Scotia during the active months of the late summer and fall are supplied by Mr. L. A. DeWolfe, Director, who reports as follows:—

The session of 1920 of the Summer School of Science was in many ways the best yet held in Truro. Each year marks a few steps in advance of the previous year.

The biggest contribution to our course in 1919 was the plays, games and sports. These are now recognized to be a necessary part of any school course. In 1920 the social side of school life was exemplified as never before, and the community centre idea became a reality rather than a theory. The Art Room of the Normal College was transformed into a combined Rest Room and Community Hall. Through the day, students who had free hours could read, write or rest. In the late afternoon, in-door games were taught. In the evening the whole school met here for a social two hours. This "Community Hall" did more than all other forces combined to create the very best school spirit we have ever had. The day's programme usually ended with one or two reels of moving pictures.

We proved to our satisfaction that one of the needs of young people everywhere was just such a social centre. Our students were not required to spend their evenings here; but, each evening found

ninety per cent of them present. Our own programme was more attractive to them than the town moving picture theatres. Hence the latter were not patronized.

Teachers who attended the course are better equipped as community leaders than any who have gone out from Truro on any previous occasion. The students themselves assert that with the science work, the games and social events, the outside lectures—which were excellent—it was the biggest four weeks of their lives. In that time the importance of their task as teachers has greatly expanded, but their growth has enabled them to keep up with it.

The enrolment was 108. Of this number, 19 were awarded diplomas; 46, one-year certificates; 7 were passed in physical drill only; 9 were graduates of former years; and 27 passed in less than four subjects.

School Fairs

This year there was a falling off in the number of schools exhibiting at the county fairs and in the older established centres. This, however, was offset by the number of local fairs in new districts. For the whole province, therefore, the number of school fairs was 153, in which 240 schools took part. A tendency is observed towards the local one-school fair, rather than towards the district fair. Two reasons are given for

this: one is the fact that parents fail to see their children's exhibits unless exhibited in the same section.

There is not likely to be much change in the number of fairs from year to year. Teachers govern such activities; and the number of trained teachers remains about the same. Older ones leave the profession as fast as a new supply is trained.

In addition to an annual change of teachers, another cause for a falling off of already established exhibition centres, is the fact that children tire of the same thing year after year. We have proved this by the added interest taken in such innovations as sports and contests. There is a danger, however, of turning the exhibition into a mere holiday of sports. That, too, would be fatal so far as educational value is concerned. We are striving, therefore, to make our prize lists as educational as possible; and at the same time to include enough sports to make the programme attractive.

Some of the travelling teachers of a year ago have now left the province. Five, however, have settled down in regular schools; but get \$150 a year supplementary salary for rural science and community work done outside of school hours or in other classrooms than their own.

We believe that more teachers are doing really substantial work than ever before. They are reaching the pupils through supervised play, school entertainments and library periods rather than through straight agriculture. Having won the children's sympathy in this way, agricultural instruction is tolerated in the same friendly spirit.

QUEBEC

The following items of interest in regard to Agricultural Instruction activities in the province of Quebec during the three months concluding with September have been gleaned from the reports submitted to the Dominion authorities for the period in question.

Agricultural Representatives

During the months of July, August and September, the Agricultural Representatives were busy preparing for their school and local fairs. As many as eight school fairs were held in some districts; the average per district being four. The fairs were very successful this year, judged by the number of entries and the quality and uniformity of the exhibits. At one fair 140 samples of potatoes of one variety were shown. The children and their parents took a great deal of interest in these school fairs, more even than in the county fairs. In fact, no better exhibits of vegetables were seen at the regular exhibitions. After judging the products, the judges give a lecture and supply useful information on the exhibits. This has resulted in an appreciable improvement of exhibits in places where such fairs have been held for several successive years.

A good deal of the time of the representatives was spent in visiting the competitors entered in the "stables" and in the vegetable growing contests. Thirty-one vegetable competitions were organized, with 683 entries.

Farmers' excursions were organized during the period, chiefly to the farm at Ste. Anne de la Pocatière. This institution was visited by the great majority of the farmers of the counties of L'Islet, Montmagny, Temiscouata and Rimouski. The farm was visited by groups under the direction of assistants, and lectures and demonstrations were given. The opinion expressed by many farmers who took part in these excursions was that they were exceedingly instructive and profitable.

Field Crop and Seed Competitions

The success of the movement for the production of better seed is proving highly gratifying to the officers of the department. Last year seed-growing centres were organized in various districts, and particularly in the districts

of Ste-Rosalie and Berthier. All the seed plots were carefully inspected this year by the provincial officer in charge of the work, accompanied by the secretary of the Canadian Seed Growers' Association. The Ste-Rosalie centre comprised 27 farmers, with an estimated output of 20,000 bushels of Banner oat seed.

The total number of standing crop competitions conducted was 161, with 3,809 entries, all of which were inspected and judged.

Proposed Seed Warehouse

During the summer a survey was made of the Lake St. John district by officers of the provincial department, with the assistance of the Dominion Cerealists, with a view of organizing the farmers for the growing and marketing of pure seed. The farmers of this district have always experienced great difficulty in procuring good seed of suitable varieties, and a solution of the question is urgently needed. As an outcome, the building of a warehouse was entrusted to the Ste-Rosalie Co-operative Association, with the understanding that the department will assist in the work of organizing.

Selection and Seed-growing Station Established

A station for the selection and multiplication of elite seed has been established at Ste-Rosalie within the last few months as a result of the efforts of the provincial department, assisted by the

Dominion officials, the Macdonald College, and the Ste-Rosalie Co-operative Association of Seed Growers. The product of this station will be propagated at the various seed-growing centres already established in the province. The Ste-Rosalie Association contributes 100 acres to the undertaking which will be in charge of the cerealists of the Macdonald College. Varieties tested at the Experimental Farms and on the college plots and proved suitable will be multiplied in this way and distributed throughout the province.

MANITOBA

During the fall months Women's Short Courses of five days' duration were held as follows:--

Dressmaking--

30 courses; enrolment 610;

Millinery--

18 " " 324;

In connection with Boys' and Girls' Club Work, three carloads of certified disease-free potatoes have been purchased for spring distribution.

The Creamery Inspector and Instructor visited forty-one creameries and addressed eleven meetings in the newer districts. He also graded several carloads of butter.

The Cheese Factory Inspector held fourteen meetings and visited thirty factories to assist the makers in turning out a better quality product. He also assisted in judging Boys' and Girls' Club fairs, paid visits to farms, and aided farmers in procuring pure-bred stock.

SHORT COURSE SCHOOLS

PRINCE EDWARD ISLAND

Since we have opened an Agricultural High School in Charlottetown we will have but one agricultural Short Course in the province. This will be held at the Agricultural High School, on January 4 to 14. Classes and demonstrations will be conducted in live stock, grain growing, poultry raising, motor mechanics and allied subjects. Lantern slides and motion picture reels will be used to illustrate the evening lectures. We anticipate having a large class of students, especially since many young men of this province are interested to-day in motor appliances for the farm, as well as other subjects of agricultural interest.—W. J. Reid, B.S.A., Director, Agricultural Instruction.

NEW BRUNSWICK

A ten days' short course in agriculture will be held in the Vocational School, Woodstock, commencing January 10. The Department of Agriculture, Fredericton, will supply most of the lecturing staff. Similar schools will likely be held at Moncton and Chatham under the direction of the Agricultural Representatives at those points.

QUEBEC

A series of short courses will be held at fourteen rural points in the province of Quebec during the winter months. The schools last from three to five days and include lectures and judging work with live stock, poultry and horticulture, and touch the more important and easily accessible points on the lines of the principal railways. The course will be in charge of the Agricultural Representatives who will be assisted by the officials of the Department of Agriculture.

Macdonald College

During the months of January and February short courses will be held at the Macdonald College in live stock, farm crops, horticulture, poultry and household science. The agricultural course will include judging, lectures and practice work in connection with live stock, field crops, grains, orchard and garden work, and the breeding, rearing, management and marketing of poultry.

The course in Household Science, which will extend over a period of about two weeks, will cover foods and cooking, home nursing, home furnishing, household accounts, household administration, laundering, millinery, nutrition, textiles and clothing, and dress-making. Each of the students in this course is given the privilege of electing one of the following subjects: Poultry, dairying, home gardening, millinery or cooking.

ONTARIO

At the Agricultural College

A useful series of farm short courses will be given at the Ontario Agricultural College during the winter months. Seven courses are provided. The stock and seed judging will occupy two weeks from January 11 to 22. The live stock judging will be carried on in the Judging Pavilion where specimens and groups of the various classes of horses, sheep, and swine will be used. In addition to the judging of animals, which will be carried on from 10.00 a.m. until noon, and from 1.30 to 4.00 p.m., each day, slaughter tests will be made. The fat cattle, sheep and hogs, after being judged on foot, will be slaughtered and again compared by the students under expert direction. At the close of the practical work each day, lectures will be

given on the breeding, feeding and management of live stock. Special attention will be given to the judging of horses, with the assistance of the stock kept at the college farm and animals supplied by neighbouring breeding farms. In seed judging, an hour and a half each morning will be spent in the study of the principal farm crops and of the most troublesome weeds in Ontario. Lectures will be given on purity and germination and on the cleaning, selecting, grading, and the improvement of seed.

Poultry Rearing

The poultry course will extend from January 11 to February 5, and will include instruction in the following branches of the poultry industry:—Location of poultry farms; situation, construction, ventilation, preparation of plans and estimates of poultry houses for various purposes; origin and characteristics of breeds and varieties of fowls; principles of breeding and mating; judging; hatching and rearing; feeds and feeding; marketing eggs and poultry.

Students' practice work will consist of feeding breeding stock; fattening; killing and dressing market poultry; operating incubators; candling and grading market eggs; and constructing poultry appliances.

Instruction will be given in the College laboratories on the anatomy of birds, poultry parasites and diseases of fowls.

In the carpenter shop, practical instruction will be given in the use of tools which are used in ordinary repairing and in the construction of coops, feed troughs, etc.

Every student is required to feed and care for a pen of birds; fatten, kill and dress a number of chickens, in addition to doing general work.

The Horticultural Course

The horticultural course extends from January 24 to March 4, and will include fruit growing, up to February 5; vegetable growing from February 7 to 9; and floriculture and landscape gardening from February 21 to March 4. The fruit growing course will include the fruit growing methods in Ontario which will cover the culture of trees and small fruits for amateurs and commercial growers.

The vegetable growing course will cover methods for both amateurs and commercial gardeners. In addition to the lectures, practical work will be given in seedage, cuttage, pricking out, potting, transplanting, etc.

The floriculture and landscape gardening will cover the growing of pot and decorative plants and cut flowers for the home and for market. The arrangement and planting of home gardens, school gardens, road sides and parks will be covered and instruction will be given in the choice, arrangement and planting of trees, shrubs, and vines. The practical work in this course will include propagation and planting as well as the drawing of landscape plans.

The Dairy Course

The Dairy Course continues from January 3 to March 18. The course for factory cheese and butter making is continued through this whole period. What is termed the Farm Dairy Course runs from January 24 to February 19; the Course in Cow Testing, from March 21 to March 31; ice cream making and soft cheese making, from March 21 to March 26. The course concludes with the Dairy Conference to be held on the 9th-10th-11th of March. In addition to the making of cheese, butter, ice cream, etc., instruction will be given in boilers, engines, piping, soldering as well as in the making of cheese boxes. Lessons in soft and fancy cheese making

will be given to the students of the factory class who wish them. The lecture course will cover live stock, breeding, feeding, health, cold storage, and other topics related to the industry.

At Country Points

In the province of Ontario, short courses in agriculture and home economics are held at one or more points in almost every county. The courses are of about four weeks' duration, commencing as a rule early in January. The courses are under the immediate charge of the agricultural representatives, who follow a general system outlined by the Department of Agriculture at Toronto, who assist in supplying speakers and demonstrators. The courses are made as practicable as possible, and are conducted in such a way as to meet the special conditions of the districts in which they are held. The agricultural and home economic short courses where practicable are conducted simultaneously. In sections where general farming is the rule, the topics covered are live stock, dairying, veterinary science, feeds and feeding, poultry, field crops, vegetable growing, soils and cultivation, fertilizers and manures, farm drainage, insects and plant diseases, weeds and weed seeds, bacteriology, farm power, co-operation and markets, farm management and book-keeping, business correspondence and journalism, and public speaking.

The home economics subjects are:—Food values and cooking, sewing, laundering, house planning and decoration, household administration, home nursing and first aid, child study and mothercraft, farm dairying, and such miscellaneous subjects as the storage of vegetables, culture of house-plants, books and reading, and such other topics as enter into home life. In both these courses demonstration by actual practice is utilized as far as practicable. The classes are held every weekday except Saturday, commencing at 9.30 in the

morning and concluding at four in the afternoon.

While the courses are in progress the students in agriculture organize themselves into Junior Farmers' Improvement Associations, and Home Economics Classes into Junior Women's Institutes. According to the experience of other years the forming of these organizations has the effect of holding the young people together for active organization work in the interests of better farming, and better home life. Following the usual custom in the province of Ontario the courses are held, as far as practicable, at points within the counties that have not been served by these courses in recent years.

The Kemptville School

A short course of three weeks' duration will be held at the Kemptville Agricultural School from January 31 to February 18. This course is designed to be of a practical and useful nature, and will combine general agriculture and farm power.

The following subjects will be dealt with:—

- Farm Engineering and Power;
- Feeding, Care, Management and Judging of Live Stock;
- Veterinary Science;
- Seed Judging;
- Manures and Fertilizers;
- Crop Rotations;
- Tillage and Cultivation;
- Farm Sprays;
- Insect Pests;
- Farm Planting;
- Farm Book-keeping and Management.

MANITOBA

A short course in farm engineering was held at the Manitoba Agricultural College from October 19 to December 24. A similar course will be held from January 10 to March 11, 1921. For this second course about one hundred and fifty applications have been received.

THE AGRICULTURAL GAZETTE OF CANADA

Eighty students only can be accommodated. These courses are intended, not only for the young men in the country, but for the more mature men on the farms. The subjects cover gas engine work, steam engines, boilers, forge shop, farm mechanics, concrete construction, building construction, farm machinery, and physics.

A course in live stock production will be held at the Manitoba Agricultural College from January 10 to February 5. The studies will include live stock judging, management and marketing; grain and forage production and grain marketing. In addition to the instruction and practice afforded at the college, the students will be given inspection trips to the Grain Inspection Department, the Grain Exchange, the Abattoir and Live Stock Yards.

SASKATCHEWAN

In addition to the three courses in gas engineering being held at the university this winter, one series of similar courses will be provided at outside points under the auspices of agricultural societies. Societies wishing to hold one of these courses must agree to provide:—

- (1) An enrolment of at least 25 students.
- (2) A well heated and lighted lecture room with ample seating capacity.
- (3) A heated building for a demonstration room, where tractors may be overhauled and operated.
- (4) Gas tractors and stationary engines. If possible one stationary engine for every 5 pupils and one tractor for every 10 pupils.

Two instructors are provided by the Extension Department. Each course is

of two weeks' duration, and the instruction given includes: Principles of the internal combustion engine; parts of the engine and their functions; cooling systems; ignition; carburetters; lubrication; timing and adjustments; care and operation of the engine, etc.

Five of these courses have been arranged commencing early in January and ending about the middle of March.

Agriculture and Household Science

Courses in Agriculture and Household Science will be held as usual this winter wherever requests for such are made. They are usually of two or three days' duration, and, wherever feasible, the courses for men and women are arranged for the same dates. Two instructors for the women and two for the men are usually sent out although often three for each are provided.

The instructors use charts for illustrating their lectures and it is hoped that this season they may also make use of lanterns and slides for giving illustrated lectures at the evening meetings. Forty of these courses were held last winter and it is expected that at least an equal number will be held during this winter. Three courses were held in December.—J. G. Rayner, B.S.A., Director of Agricultural Extension.

BRITISH COLUMBIA

Owing to the congestion of classrooms in the College of Agriculture, University of British Columbia, during the past two years, it has been found impracticable to hold short courses at the university during the winter months. Extension schools are, however, being offered at various points on the mainland and on Vancouver island.

SHORT COURSES IN RURAL ECONOMICS

TO BE HELD UNDER UNIVERSITY AUSPICES

Short courses in rural economics are arranged to be held at the Manitoba Agricultural College on January 17 to 28, and at the University of Toronto from February 7 to February 19. The Manitoba course will be conducted under the auspices of the Manitoba Agricultural College, the University of Manitoba, and the United Farmers of Manitoba. The Toronto course is being held in co-operation with the United Farmers of Ontario. These courses which are held for the first time under university auspices will be conducted with a view to developing personal equipment for the responsibilities which are being placed more and more upon workers in the rural communities. The topics presented are expected to appeal to those who look forward to intelligent and efficient citizenship, and to the rendering of a true citizen's service to the neighbourhood.

Professor W. T. Jackman, of Toronto University, will have charge of the

course at Winnipeg, and will take a prominent place in the course at Toronto. His lecture topics will include: Land, its acquirement and use; the economy of farm management; labour as related to agricultural production; capital and its importance in the operation of the farm; co-operation applied to marketing and other rural activities; rural credit, and other topics.

In the Winnipeg course Professor Jackman will be assisted by local instructors and leaders in the farmer's movement. In Toronto other prominent members of the university staff will deal with such topics as rural architecture, public health and hygiene, English literature, and Canadian History. At Winnipeg lectures will continue both morning and afternoon. At Toronto the lectures will all be given in the forenoons, and in the afternoons visits will be made to such places of interest as the Legislature, the Royal Ontario Museum, and the Stock Yards.

"The main single deficiency in rural life to-day is the lack of enough of the right kind of education. The general lack of scientific knowledge relating to farming and to the needs of rural home life, on the part of rural people, has long been a common observation. Conversely then, the main single remedy which must be applied to the rural life-problem is educational, and consists largely in a re-direction of rural education itself. By means of a re-directed education, we may hope to disseminate new knowledge relating to rural life needs and problems; to teach young people agricultural facts and fundamental principles, to awaken a deep love for the open country on the part of those born there, and a desire to live there; to develop better standards of taste for estimating pleasures and attractions outside the farm; to stir into action community forces which are now dormant; and to make of the rural school a strong and efficient social centre, working for the up-building of all the varied interests of a healthy rural life."—A. C. Gorham, M.Sc., in *Rural Education Monthly*.

PART III

Junior Agriculture

MANITOBA

EXTENSION SERVICE NOTES

Club Champions' Tour

The Manitoba Agricultural Extension News for December announces the proposal to undertake a sightseeing tour for one hundred Boys' and Girls' Club champions. The tour under consideration would include a visit to some of the more important agricultural colleges in Canada and the United States. Those taking the trip would be required to qualify through a competitive examination covering agricultural club and farm work. The cost of the trip for each member is set at approximately \$250. The members would be required to earn one-half of this amount, \$75 of which would be earned in a club project prize, and the remaining \$50 provided in other ways. The Extension Service expects to be able to secure the balance of the money required.

Baking Clubs

The Extension Service of the Manitoba Department of Agriculture has outlined a plan for the organization and work of baking clubs. A baking club may consist of two girls or more who are of club age, and who desire to take up the baking project. The club may meet in domestic science rooms or in private quarters where the necessary equipment can be obtained. The activities of the club include:—

(a) Practical work in homes;

(b) Regular meetings—talks, songs, games, demonstrations;

(c) Social meetings, tramps, followed by a bean supper;

(d) Charts of credits for all work done;

(e) Sale of work at end of three months.

The clubs are not expected to make every meeting a work meeting but are encouraged to hold social gatherings.

Boys' and Girls' Club Features

In addition to the regular work being carried on by the Boys' and Girls' Club of Manitoba, the members are expected to lay particular emphasis on special activities. Potato work will engage the special attention of club members in the Swan River Valley and the North Central part of the province. In these sections clubs will undertake the growing of certified Irish Cobbler potatoes. The Department of Agriculture, through the Extension Service, will supply a limited amount of high class seed which will be sold to clubs at cost.

Poultry Project

A number of clubs in the southern part of the province are specializing in poultry work. This project has been divided into (a) Chicken Rearing, and (b) Breeding Flock. The rules for the chicken contest are:—

1. Members agree to set at least two sittings of eggs;

2. Do all the work in connection with rearing the chickens;

3. Keep a record of all the cost of eggs, feed, labour, etc.

4. Exhibit some of the chickens at the fair.

In the breeding flock project, members must own and keep specified records from the beginning of the year to the first of June, of a flock of at least ten pure-bred pullets and one cockerel. Provision must be made for keeping these birds separate from other poultry. Eggs from this pen may be used for hatching and may be sold for a similar purpose. Fifty chicks is placed as the minimum to be hatched by a member before the middle of May. The chicks must all be marked with a toe-punch when they are two days old. Clubs must have at least five members all of whom must keep the same breed. The Department supplies application and expense forms for the use of the members.

Grain-growing Clubs

Grain Clubs are being organized at points where members have taken special

interest in growing seed grain of high quality. The rules and regulations governing the Grain Growing Club require that at least ten members, ranging from 13 to 19 years of age, shall constitute a club. Only registered seed may be used. The Department will provide the transportation charges on registered seed, which may be purchased with money borrowed from a local bank. From wheat, oats, and barley, members must grow from 2½ to 5 acres; from corn, legumes and grass crops an acre will suffice. The members are required to take full charge of seeding, care of the plot, and harvesting. Provision should be made for competitions both for standing crop and threshed grain. The Department is preparing to pay 50 per cent of the prize money for these competitions. The local prizes awarded will be offered for grain exhibits from these plots at the Soils Products Exhibition in Winnipeg in the following January.

SASKATCHEWAN

FARM BOYS' CAMPS AND THE FOLLOW-UP PROGRAMME

BY JOHN G. RAYNER, B.S.A., DIRECTOR
AGRICULTURAL EXTENSION

THE Saskatchewan Farm Boys' Camps, held at Regina and Saskatoon at the time of the 1920 summer exhibitions at those centres, were very successful. A total of 245 farm boys attended the Regina camp and 175 the camp at Saskatoon. The programme of the former camp consisted largely of stock judging competitions, and, at Saskatoon—in an endeavour to make the greatest use of the experimental plots at the university—grain and crop judging and identification contests were staged. In addition to these features, there was the usual Y.M.C.A. programme of physical drill and recreation

as well as visits to points of interest in the cities.

Last season an entirely different agricultural programme was arranged at each point for the reason that the two camps are each part of a definite scheme and the boys are supposed to begin their camp attendance at Regina and complete the course by attending the Saskatoon camp the subsequent year.

The camp movement has been developed as a special "boys' work" feature for the agricultural societies. It is recognized that if the agricultural society is to continue to be successful it must claim the interest of the young people in some definite way. With this end in mind the camp movement was

extended in 1920 to include what is called the "Follow-up." programme. This programme is organized by the Extension Department of the Agricultural College and entitles any boy who has attended a camp to receive help in undertaking one of four projects, namely, pig raising, sheep raising, poultry raising and wheat growing. The pigs and sheep are purchased and bred and shipped to the applicants under the direction of the Live Stock Branch of the Department of Agriculture; the wheat is supplied through the office of the Field Crops Commissioner of the department, and the poultry is supplied by the poultry department of the College. The local agricultural society assists the boys in making financial and other arrangements in connection with their purchases.

The following applications have been received:---

	Applica- tions
Pig raising (one sow each)	30
Sheep raising (three ewes each)	22
Wheat raising (5 acres each)	17
Poultry raising (one pen each)	2

This follow-up programme is a constructive effort to interest farm boys in the production of only the best farm products. After the boys receive their contest material, an effort will be made to keep closely in touch with them in their work. Special prizes will be offered at the winter stock and poultry shows and the provincial seed fair for the exhibits.

As before stated, this programme enables the agricultural society to render a definite service to farm boys. The work differs from Boys' and Girls' club work in that it is considered to be more advanced. The boys must qualify by first attending one or more farm camps. Definite assistance is given in the securing of supplies, and the contest is considered to be definitely vocational. As with club work, there is involved ownership, responsibility, profit, competition with others, and other features which appeal strongly to normal boys. There has been a general demand for the extension of the camp idea to embrace some such programme as this and it is confidently expected that it will offer a popular service.

HOUSEHOLD SCIENCE IN TOWNS AND VILLAGES

BY MISS FANNIE A. TWISS, B.S., DIRECTOR OF HOUSEHOLD SCIENCE

THE Department of Education of the province of Saskatchewan is making an effort to interest the ratepayers of the towns and village schools in the teaching of household science by holding short courses of three weeks' duration. These are conducted by members of the extension staff of the Household Science Branch. The inspectors of schools are asked for suggestions as to the best localities in which to conduct the work. Places near together along the railway line are usually selected so that they may easily co-operate later on in getting a teacher.

During the previous year and a half, thirty-three places have been visited and

4,000 persons have received instruction. Those participating are the boys and girls in the lowest grade and the girls in the upper grades and the High School. Girls who have left school and are mothers' helpers at home, are encouraged to come. Pupils from the country, who are near enough to drive to the towns for the lessons, are made welcome. A few evenings during the course are devoted to meetings of the mothers, when discussions and demonstrations are carried on. At the close, a visiting day for parents and the school board is held. Refreshments are prepared and served by the class, and the work in sewing is exhibited.

The subject-matter of the lessons is very simple and practical. It includes the study of the best and quickest ways of preparing, cooking and serving the common foods, such as fruits, vegetables, cereals, etc., used every day in the home. Attention is paid to proper care of food supplies.

In the lessons in sewing, the use of patterns and the construction of simple garments is taught in the upper grades. Practice in hand and machine work is

The equipment furnished by the school board is quite simple and does not exceed \$50 in cost. Sufficient utensils are purchased for a class of twelve. The extra stoves needed and the sewing machines and dishes are loaned by the mothers. Ordinary tables and chairs are borrowed or trestle tables are made. A cupboard is furnished in which the equipment is stored when not in use.



SHORT COURSE IN HOUSEHOLD SCIENCE, HIGH SCHOOL, GAINSBOROUGH, SASK.

given. Patching, darning and simple hand sewing is taken in the lower grades. The little children in the lowest grade never fail to be delighted with the interesting fairy stories about food and health which are told them by the teacher conducting the course. The work in the lower grades is conducted in the presence of the class teacher so that she may continue it after the course is finished. Wherever needed the noon lunch is carried on and becomes a part of the school programme.

For many of the courses a vacant room in the school is used. Wherever the overcrowded condition of the school renders this impossible a room outside is procured. At the High School at Sintaluta, no room was available in the school house. Nearby was a little, old meeting house, now used as a hall. This was assigned to the class, and their first lesson with Miss Margaret McColl was one in housecleaning. They cleaned it thoroughly and transformed it into a home-like kitchen.

The finishing touch was given when they hemmed curtains for the small windows. At the close of the first day they were ready for the three weeks'

to see it carried on. This opens the way for the establishment of the itinerant teacher of Household Science. Where two or more schools jointly em-



SHORT COURSE IN HOUSEHOLD SCIENCE, CRAIK, SASK.

work, which they finished as enthusiastically as they had begun.

The short course gives the pupils a chance to try the work and the school boards and ratepayers an opportunity

to employ such a teacher, the Department of Education gives assistance to the extent of paying half the salary up to a maximum grant of \$750.

ALBERTA

WOMEN'S INSTITUTE BETTER RURAL SCHOOL MOVEMENT

BY MISS BESSIE C. MCDERMAND, ASSISTANT SUPERINTENDENT

AMONG the many activities of the Women's Institutes of Alberta perhaps none is more interesting and effective than the Better Rural School project which was first taken up systematically in 1918. In that year many delegates came to the provincial convention with problems concerning their rural school conditions. The result was

that the convention delegates courageously decided to abandon the traditions of conventions and not only moralize, discuss at length, and pass resolutions relative to proper school environment but to go home and do something.

When it is realized by thoughtful parents that the greater part of a child's day is spent at school, speculation on

the influence of the environment afforded by the usual rural school is not a pleasant pastime. In many schools the child is greeted in the morning by the identical clog of clay on the floor which he left the night before, thick dust everywhere, opaque windows, torn blinds and shabby walls. And educationalists tell us the impressions of childhood are of long duration! Unfortunately, too, many Albertan children, as is expected in a new country where immigration is encouraged, go to homes where there is a serious lack of comforts and health regard. The importance of creating good impressions at school is most obvious.

Plan of Attack

The Institute plan of attack was to first create local interest in the Better Rural School project. In dozens of communities Institute leadership was strong enough to enlist the personal interest and devotion not only of the members of the Institute but also of the majority of individuals in the district. The Institutes appointed educational committees to do similar work to that of Parents-Teachers' Associations. These committees reported the findings of local school investigations to the local Institute and with the co-operation of the Institute tried to meet the need.

This work of the Institutes is felt mainly along two lines—sanitation and hygiene and aesthetic culture.

Only the necessary preliminary moralizing was in the clouds, for the Better School project is being securely tacked to earth by such acts as taking the broom and wash-cloth in hand and scouring up the interior of the schools. It is surprising to find the number of cases where this is necessary. To follow up this line of attack the Institute members if they were unable to secure suitable

caretaking service made arrangements for it among themselves, and we hear that new kalsomine and paint makes its appearance yearly in many Institute-mothered schools.

The Hot School Lunch

In the sparsely settled districts of Alberta many children have to walk or ride four or five miles to school. Especially in cold weather the need of hot food is felt and accordingly dozens of Institutes, with the co-operation of the teacher, are serving hot school lunches. The Institute's part is to supply the equipment necessary and make arrangements for milk supply, sugar, seasonings, and staple foods. In many cases the Institutes have not only furnished equipment but have also built a kitchen on the school so that the children are privileged to sit down at a real table with the persuasion of the teacher's discipline.

Those who have attended a rural school remember the two cups (one for the girls and one for the boys) chained to the old pump. Much abused cups they were, sadly deteriorated in capacity and in appearance by the weathering of dust, knocks, grease, rust, lime deposit, and the general accumulation of years. The Institute school-mothers believe in a new order of things; sanitary cups and bubble fountains have found their way to many rural schools. Little services like this, and donations of pencil sharpeners, enamelled chalk, dainty white curtains, and flower pots cannot help but provide a means of stimulating in the child a regard for refined surroundings, health, and the worth of conveniences.

Realizing that the child's character is not formed by what is learned by rote, but rather by what he learns to love and admire, the school-mothers began to speculate as to the artistic value of the local grocer's

Christmas calendar as the only wall decoration. Now, the supplying of pictures—good prints of masterpieces—is one of the most popular features of the Better Rural School movement. The Institutes of two constituencies took this up last year and supplied each school in their constituency with two well framed pictures, and dozens of Institutes have followed their lead.

Music has not been forgotten; many Institutes have placed musical instruments in the schools. Last year several victrolas were purchased, as well as pianos and organs.

The Flag

In 1919, the Institutes of one constituency banded together and provided the means for the erection of flag poles for each school in the district. Dozens of organizations have provided flags both large and small for school use. This feature of the work has been particularly popular among Institutes situated near foreign settlements.

The first work in connection with the schools was taken up years ago when prizes for certain merits were given. In many cases this is still done and the present Women's Institute Scholarship fund may be a development of the feature. This scholarship is arranged by the Institutes of a constituency for the benefit of a girl in the district. The Department of Agriculture gives a five-day Home Economic course free to any class raised by the Scholarship Committee. A sufficient sum to cover one year's expenses at a provincial School of Agriculture is awarded to the girl with highest examination standing. This year

three scholarships have been given in the province.

Many donations of good books have been made to the schools. One rural Institute thirty miles from a railway line plans to buy \$100 worth of books each year. The books are to be used by the residents of the community as well as by the school children. Current event magazines have been placed in many schools this year through the generosity of the local Institutes.

Play Equipment

Even serious Institute school-mothers have not forgotten that there must be play, and many little tots are far more fortunate than their older brothers and sisters. Nice clean sand piles, swings, teeters, basket ball equipment, slides, etc., have made their appearance on many a country school ground; and in a few instances trees have been planted for the sake of their beauty and shade.

Many services too numerous to mention in detail have been thoughtfully planned and carried out by the school-mothers. Each new plan designed for the comfort, health, and welfare of the children has meant not only benefit for the children themselves but renewed interest in child welfare on the part of parents. The results so far seem to indicate that the children are taking their part in acting as teachers. Through the channel of the school many homes are being benefited by the influence of the better homes in the locality, thus attaining a more congenial social condition which so helps to develop the social virtues necessary to a happy community.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes

THE PROTECTION OF MIGRATORY BIRDS IN CANADA

BY HOVES LLOYD, SUPERVISOR OF WILD LIFE PROTECTION

The Dominion Parks Branch, of the Department of the Interior, administers the Migratory Birds Convention Act in Canada. This Act, which is based upon a Treaty with the United States, protects three great groups of birds: The insectivorous birds, which are of such great value in protecting our crops from the ravages of insects, and which give so much joy to all by the exquisite notes of their songs, and the beauty of their plumage; the game birds, upon which we are dependent for wholesome recreation; and the non-game birds, including such families as the gulls and various sea-birds which are protected because of their aesthetic value.

This treaty furnishes us with the only means of protecting Canadian birds during their winter sojourn in the United States. By it both countries have agreed to extend absolute protection to all the important groups of insectivorous birds, as well as the nongame birds, and to grant similar open seasons to take those game birds for which open seasons are provided. These open seasons are of uniform length in the United States and Canada. An important feature of the Treaty relating to game birds is that all spring shooting of these birds is forbidden.

The Dominion Parks Branch, in administering this law, has endeavoured, primarily, to have all provincial laws amended, so that they would be in conformity with the Treaty; and once this has been done the Provinces concerned carry out the provisions of the Treaty when enforcing their own game laws.

In certain provinces the game laws differ in important respects from the terms of the Treaty, and in these provinces a full time warden service is maintained. In provinces where game and insectivorous bird laws conform with the treaty the activities of the Branch are largely educational in nature. However, the services of persons interested

in bird protection in all parts of Canada are utilized by having them appointed Honorary Game Officers. These officers have full power to enforce the Act, and there are now some hundred of them.

Many of the bird protection and natural history societies are assisting in the enforcement of the law by requesting certain of their members to apply for these positions.

Bird sanctuaries are being created in suitable places throughout Canada to protect the breeding grounds of water-fowl and other important bird localities. The protection of water-fowl in the great plains is most important. The water-fowl need the protection because of the increase in agriculture and the drainage of many of their former nesting areas. The great breeding ground for the ducks of North America is the southern half of the three prairie provinces, roughly coinciding with the area suitable for agriculture in those provinces. In addition to the government sanctuaries in those provinces each farmer should be encouraged to protect the water-fowl breeding on his own land. The breeding ground for these birds beyond the agricultural area is not illimitable as many seem to think.

In addition to lectures by members of the staff, knowledge of the Act and of the activities of the branch in administering it have been disseminated by means of posters and pamphlets. Copies of any of these pamphlets, which are still in print, may be obtained from the Commissioner of Dominion Parks, Department of the Interior, Ottawa.

The Migratory Birds Treaty offers the only possible solution of a vexed problem, that of the protection of our birds in the United States. It behoves us as Canadians to do our part in furthering the interests of this treaty, and then we can look with confidence and expectation to the United States to carry out its share of protection for the valuable birds of the continent.

THE RELATION OF BIRDS TO CROPS

BY MRS. RUBY R. MILLS, SEC., HAMILTON BIRD PROTECTION SOCIETY

Definite data are now available regarding the food habits of a large number of species of birds. During the past twenty-five years the biological section of state agricultural departments in all progressive countries has increased in value in its contributions to the advance of agricultural science by its pronouncements on the life histories of insects, birds and mammals in relation to man and his enterprises. The literature on the subject issued by the United States Bureau of Biological Survey in connection with the United States Department of Agriculture, is particularly voluminous and valuable, containing extensive surveys regarding the economic status of the crow, the European sparrow, the rat, and other vermin. Canadian research work in this field is highly creditable, however, every provincial department of agriculture now issuing farmers' bulletins from the pens of biological experts.

The more intensive the cultivation of the soil, the fuller must be our information regarding every factor contributing to the greater yield of food per acre or the falling off of the yield. The merest beginner in gardening faces the same problems as the extensive corn grower. The problems for instance of retaining nitrogen in the soil, of defending roots from insect pests and small vermin underground, of defending stalks and leaves and fruit from insect pests and vermin above ground, of protecting shrubs and plants from extreme weather by wind breaks, among other things.

The farmer need hardly be reminded that his operations have changed the face of the country. Settlement alters even climatic conditions. The felling of the trees, the filling-up of marsh lands, the diversion of streams, the pollution of rivers, have radically affected and modified the wild life of Canada as of other lands so treated. The extermination of the larger wild animals has permitted the undue increase of the smaller mammals. The "balance of nature" has been disturbed, and man has to exercise his wits to restore the balance by artificial means.

The cultivation of millions of acres of succulent plants has provided a new and never-ending food supply for the insect world. The more food man grows for himself, the more he provides for insects and small vermin. Probably never before in the history of the world has insect life been so abundant as now. At the same time that he has been increasing food for insects man has been hard at work for the past two centuries in America doing his best to exterminate the natural check on insect life, the

great order of birds. He has improved guns to slaughter insect enemies, trained dogs to pursue them, motor launches to track them to their quiet feeding places, decoys, traps, swift motor cars, automatic guns, every conceivable device for following and slaughtering the one and only order of beings provided by nature with the means of saving the food of the world. Ignorance, folly, madness, have been and are still, displayed to a greater degree by men in their treatment of birds than in any other direction of their activities.

Sixty years ago millions of passenger pigeons traversed the continent twice annually, beautiful, harmless and tame. The short-sighted settlers slaughtered them coming and going until today not an individual remains. The wild turkey and the sage hen have met the same fate. Several species of sea and shore birds are near extinction. The cheerful, useful robins would ere this have been seriously reduced in number by being slaughtered in their southern roosts had not the Migratory Birds Convention of 1916 intervened to save the species. The Treaty between Great Britain and the United States to protect insectivorous birds, game birds and non-game birds was signed in Washington on August 16, 1916. Canada confirmed this by the Migratory Birds Convention Act in July, 1917, and the United States Supreme Court handed down judgment of the Treaty's constitutionality in April, 1920.

Over 300,000 insect species have been already classified and described. Entomologists believe that twice that number of species remain for description and classification. The number of species in this order of living things already named, far exceeds the number of the species of all other creatures on earth. And all other species, both vegetable and animal furnish food for these masters of creation. At every point man is confronted with the problem of controlling insect life. Enormous sums are expended in compounding poisons and applying them to fruit trees, grain crops and garden truck. The utmost labour cannot control the increase of insects.

The Grasshopper stands second on the list of the destroyers of crops. The alarm of an outbreak is cabled round the world. In 1920 the Canadian West was menaced, and heroic efforts were made by the state to kill the insects. They were seen by millions around Melita, Lyleton and Medora in Manitoba, and the despatch stated that "the only hope" was that the eggs would hatch early and the young hoppers be killed

by late frosts. Most species of birds devour grasshoppers with enjoyment. Here is a partial list of birds proved by their stomach-contents to eat this insect: Crow, Bob White, Jay, Meadowlark, Robin, Killdeer, Sandpiper, House Wren, Rock Wren, Kingbird, Catbird, Nighthawk, Veery, Wood Thrush, Brown Thrasher, Maryland Yellow Throat, Yellow Warbler, Chickadee, Vireos, Cedar Waxwing, Scarlet Tanager, Herring Gull, Plover, Hawks, Owls, Duck—the list could be extended to most species. Thirty grasshoppers were found in the crop of one Catbird. Prof. Aughey saw a pair of Long-billed Marsh Wrens carry 31 small locusts to their young in one hour. Prof. Beal found 60 grasshoppers in the stomach on one Nighthawk. Never, never, injure a Nighthawk! Its plaintive call over our cities is that of a friend. It might well be called "Mosquito Hawk." Insects are its only prey.

The Owls and Hawks are other species greatly misrepresented. The Owls may always be convicted of wrongdoing if guilty by the evidence of the nature of the pellets of undigested food regurgitated at their roosts. The slow flying Marsh Hawk, scouting over meadows should never be molested. It seeks the field mice and small rodents so destructive to roots and grain and seldom attacks birds. The villains of this family are the Goshawk, Cooper's Hawk, Pigeon Hawk and Sharp-shinned Hawk, which are swift of wing, tough and wiry of body, and good matches for a sportsman's skill.

No one should molest a little Screech Owl. It is protected by the laws of Ontario and is perhaps the most useful of its family. It lives on mice, grasshoppers, moths and beetles, though, driven by hunger, it attacks and kills small birds.

The relation of the Crow to agriculture has been exhaustively examined by the Biological Survey, Washington. Bulletin 621, by E. R. Kalmbach deals with this subject from every point of view. The writer assembles a large array of testimony for and against this cleverest of the bird kind. It is tempting to pursue it, but the time allotted to this paper does not permit of reporting anything but conclusions reached from examination of the stomachs of 2,118 crows. As this bird is omnivorous she contents covered flesh, fish, bird and vegetable food. Here is the verdict: "When feeding on injurious insects, crustaceans, rodents and carrion, and when dispersing seeds of beneficial plants, the crow is working largely for the best interests of man; when destroying small reptiles, amphibians, wild birds, poultry, corn and some other crops, when molesting live stock and distributing their diseases, and when spreading seeds of noxious plants, the bird is one of the farmer's

enemies; when destroying spiders and mollusks its work appears to have a neutral effect. The misdeeds of which the Crow has been convicted greatly outnumber its virtues, but these are not necessarily equal in importance. Much of its damage to crops and poultry can be prevented, while the bird's services in the control of insect pests can ill be spared. . . . A reasonable reduction of numbers of crows is justifiable in areas where there is an overabundance of the birds. . . . The verdict is a suspended sentence.

Plant lice are among the most difficult of insect enemies to control, because lice take food by suction. Here the small birds, wrens, warblers, kinglets, chickadees, etc., are of great value. It is a well-known and undisputed fact that some birds subsist through the winter on the eggs of plant lice. Edward Howe Forbush gives a list of 38 species of birds found by observation to feed on plant lice, including the injurious birch aphid. By the same painstaking methods 51 species have been proved to feed on hairy caterpillars.

The rapid digestion of birds—in from 20 to 60 minutes—the great quantities of animal food demanded by the rapid growth of their nestlings, and by the ceaseless activity of adult birds, makes their levies on the swarming legions of insects of utmost benefit to agriculture.

Prof. Bracken, addressing the Canadian Club, Regina, in March, 1920, said that Saskatchewan farmers lost \$25,000,000 a year by growing weeds. One hundred millions of dollars would be a conservative estimate of the loss of all Canadian farmers by growing weeds. Now, it has been proven, to a decimal, that the best-adapted agency for the destruction of weed seed is the bird. The bird charges nothing for its services but a few bites of fruit at the most. If provided with drinking dish or fountain and with shrubs and trees bearing wild fruits, even these small levies would be omitted.

In controlling weeds the Bob White is again to the front. Eighty-five varieties of weed seeds have been found in the crops of quails. One thousand rag-weed seeds have been counted in one crop; in another 1,000 crab grass seeds; in another 5,000 seeds of fox-tail grass, in still another crop 10,000 pig-weed seeds. Government Reports of Virginia and N. Carolina say that if there are four quail to each square mile of land in those states and the crop of each bird contains one-fourth of an ounce of weed seeds twice a day from Sept. 1—April 30, the total consumption of weed seeds by this number of quail would amount to 1,341 tons.

It is known by actual count in their stomachs how many seeds certain birds eat

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at one meal, and by actual count of seeds laid down and picked up by birds at feeding stations. A few data follow:

Snowflakes: 500-1,500 seeds of amaranth at one meal.

Mourning Doves: (1) 7,500 seeds of yellow wood.

Sorrel (2) 6,400 seeds of same weed, (3) 9,200 of same weed.

Tree Sparrow: 700 seeds pigeon-grass in one stomach.

Fox Sparrow: 1 ate 103 seeds Japanese millet in 2 m. 47 s.

Juncos: ate at same rate.

Song Sparrow: 34 seeds in 1 m. 10 s. and 154 in 3 m. 45 s.

If each bird took 30 seeds a minute on an average each day, the total in a winter would be reckoned in tons. Prof. Beal declares that Tree Sparrows—one of the prettiest of the species, too, consume 870 tons of weed seeds in one winter in the State of Iowa—a low estimate, he adds.

This great group of birds—the sparrows, belongs to the family Fringillidae which includes the finches, sparrows, grosbeaks, buntings, linnets and crossbills. About one-seventh of the birds of America belong to this family. All are seed-eaters, all insectivorous, all beneficial. This statement should be qualified by excepting the European Sparrow imported 50 years ago, which has multiplied beyond bounds. It is erroneously termed "English." The qualities of *Passer Domesticus* have been exhaustively examined both in Europe, Australia, New Zealand and America. Both there and here it is regarded as more or less of a pest. The testimony against it is overwhelming. Its services to the farmer are fewer than that of any species of its family.

We cannot realize with what an overwhelming wave of destruction would arise from insect hosts if for some reason the spring influx of bird life were to fail and its music remain silent.

THE HAMILTON BIRD PROTECTION SOCIETY

BY RUBY R. MILLS, SECRETARY

Early in 1919 two enthusiastic bird-lovers suggested that there should be an organization for the protection and study of birds in the city of Hamilton; and on this suggestion a committee was formed and a public meeting called. Over fifty members joined at this meeting; and a constitution was adopted in which it is set forth that the objects of the society are: "To extend hospitality to the wild birds; to protect them from their enemies; to acquire a greater knowledge of the bird-life of this vicinity, and to awaken a greater public interest in bird-protection and bird-study." As Honorary President, the society is fortunate in having Mr. Adam Brown, "the father of bird-protection in Canada," who, as member for Hamilton, introduced the first bird-protection legislation to the Dominion Parliament. The adult membership (paid up) is now over two hundred, and, except for a few small cash donations and a gift of printing from an enthusiastic member, the society has been financed entirely on membership fees. Though in existence scarcely a year and a half, the society feels justly proud of all that has been accomplished in so short a time.

In common with other societies having similar objects, the Hamilton Bird Protection Society feels that every child in Canada should be interested in our birds, and its work with junior members has been most encouraging. This has been demonstrated by the enrolment of 9,468 school children last winter and 6,200 already this fall in the city of Hamilton

and the two adjoining counties of Wentworth and Halton. The success of this work is due to the interest and co-operation of the inspectors, principals and teachers, who have formed "Junior Bird Clubs" in their classes and collected the small fees from the children. In return for the fee, each child receives a set of "Educational Leaflets," including coloured plates of birds and outline plates for them to colour. They also receive a membership button with a bird-picture in colours. This material is supplied by the National Association of Audubon Societies, and about half its cost is met from the funds of that association. Last year, a competition in building nesting-boxes was held in one school, at which officers of the society acted as judges; and this year it is hoped to hold a larger competition. With the growth of the society, there is room for its work among junior members to expand indefinitely.

The society has been granted the grounds surrounding one of the city reservoirs as a bird-sanctuary, which it has equipped with weather-vane feeding-shelters and a number of Saunders feeding-boards. Last spring, nesting-boxes were placed in the sanctuary and were patronized by the birds. In addition to this sanctuary, many members of the Society have had good results in feeding the birds about their homes and in erecting nesting-boxes. The city of Hamilton, at the request of the society, has declared Wabasso Park, on the north shore of the harbour, a

bird sanctuary and has equipped it with feeding-shelters and nesting-boxes. In this place it is interesting to note that the city erected nesting-boxes and put out food in a park in 1875; but then it was for the European house sparrows, at that time still so rare as to be thought desirable.

Hamilton has, on its western boundary, a wonderful area known as the Dundas marsh. It has been a perfect paradise for birds, especially for migratory water-fowl, and present observation shows that the amount of shooting due to the proximity of the city is reducing their numbers yearly. The society is now trying to have this area declared a bird sanctuary by the Dominion and provincial governments. The idea has been endorsed by Jack Miner, Mr. C. W. Nash, and other well-known ornithologists and bird protectionists; and, with the support that has been received from the Wentworth County Council and other local bodies, there is every prospect of this area being made safe for the birds.

Each season the society intends to hold a series of meetings, at which addresses on birds will be given to the members and their friends. Last winter six meetings were held,

all of which were open to the public, and all but one of which were free. These meetings were highly appreciated, and over five hundred people attended the first meeting of this season, when Mr. F. H. H. Williamson, Deputy Commissioner of Dominion Parks, spoke on "Sanctuaries," illustrating his address with motion pictures taken in the Dominion Parks. Other speakers this season will be: C. W. Nash, author of "Birds of Ontario in Relation to Agriculture"; Miss E. L. Marsh, of Peasmarsh Farm Bird Sanctuary, Thornbury, Ontario; W. E. Saunders, the well-known ornithologist, of London, Ontario; and (it is hoped) Jack Miner, whose wild goose sanctuary at Kingsville, Ontario, is such an example of what can be done for the birds.

What is being done in Hamilton should be done in every community throughout the Dominion. There are Bird Protection Societies in many places already; but there is a wide field still where there are no organizations, and this should be filled. If the brief experience of the Hamilton Bird Protection Society is of value to new societies which may be forming, it will be only too glad to hear from them and to offer them its advice.

THE McILWRAITH ORNITHOLOGICAL CLUB

BY C. G. WATSON, SECRETARY

The McIlwraith Ornithological Club of London, Ont., is slated to meet on the third Monday of each month, the July and August meetings usually being cancelled. The meetings are carried on in a friendly, free and easy style, with plenty of open discussion, and are usually featured by a talk by some member, or often an outsider, on something of interest to bird lovers. During the present year we have had some good addresses on bird-protection, attracting birds about the home, feeding birds in winter, etc. Some of our members have been very successful in attracting birds to their feeding devices and have enjoyed cardinals, downy and hairy woodpeckers, white-breasted and red-breasted nuthatches, chickadees, etc., in front of their windows all winter.

Our active field workers have had a splendid year and have made a list of 178 species of birds observed during 1920 in the vicinity of London.

Ten of our members have been sworn in as honorary game officers to assist in carrying out the provisions of the Migratory Birds Convention Act in this locality. The large number of boys and men that infest the outskirts of cities with revolvers, small rifles

and shotguns, and who shoot carelessly at any wild life, is a matter that should be dealt with by the government, and something done to put a stop to such practice. We feel that if a good stiff annual license fee was required of each before being allowed to carry such weapons at all, it would greatly lessen the dangerous nuisance. There is really nothing to hunt in many such infested areas.

We look forward to a profitable series of winter meetings, to which we always welcome students from any of the schools or universities, and indeed anyone interested in nature study. We especially encourage young people and we are glad to have them come without any fee, as our object is to increasingly widen the interest in bird protection, which is now recognized as so important in the best interests of the country.

We trust that more of the smaller centres will organize bird clubs, as we feel it is well worth while, both from the enjoyment such an interesting study affords, and the economic value to the agricultural community resulting from increased bird protection.

QUEBEC SOCIETY FOR THE PROTECTION OF BIRDS

BY MRS. W. E. L. DYER, SECRETARY

During the summer lectures on bird life were given at the various summer camps for both boys and girls. These camps are mostly situated in the Laurentian mountains. Much interest was taken in these outdoor talks, and for the evenings or rainy days a lantern and beautifully coloured slides were provided. This work will go on during the winter as requests come to us for talks on birds in Y.M.C.A.'S, Y.W.C.A.'s, schools, and latterly from the Boy Scouts.

A movement is now under way to get the Scouts enlisted in the care of the bird boxes which the society has placed on Mount Royal and in the cemeteries. These sanctuaries, when established, need care, which the boys can give, cleaning and repairing the boxes after their summer occupancy, and, above all, creating in the boys that love for the birds themselves which is the main reason for all our work. A competition will be held for the boys caring for these boxes. Prizes will be given for the best essay on "How to Attract Birds," and "The Best Means for their Protection."

Last season hundreds of Montreal school children joined the society, signing the pledge and wearing the button. This year a circular letter is being sent out to all the schools of the city explaining to the principal the value to every child of a real love for birds and the consequent interest in their protection. To these junior members it is now definitely planned to give a free illustrated lecture annually by an ornithologist of note. Last year Mr. Herbert K. Job, of the National Association of Audubon Societies of the U.S.A., delivered this lecture in the

Imperial theatre in the month of March. The lecture for this year will be announced as soon as possible after the Christmas holidays.

It is planned also to give one or more lectures to the general public during the winter season. A nominal fee is charged for such lectures, as the expense of bringing a noteworthy lecturer to Montreal is a heavy drain on the small funds of the society.

For the adult membership of the society an interesting winter's programme is carried out. This programme consists of monthly meetings held on the second Monday evening in each month in the Windsor hotel. Addresses are given by prominent ornithologists. Some of the lectures are illustrated and discussion is always invited.

Every Saturday afternoon during the autumn season field walks are held to adjacent places of interest where birds can be best studied under competent leadership. With the earliest signs of spring these walks are again taken up.

The Society now has eight honorary game wardens, and all possible co-operation is given the Dominion Parks Branch in the enforcing of existing laws.

This society would be delighted to see organizations such as ours scattered throughout the province, either as separate societies or branches of this society. Our song and insectivorous birds need protection, need legislation and the enforcement of existing laws and this work is patriotic, economic and cultural.

MEETINGS OF ASSOCIATIONS

January 10-12, 1921. The annual meetings of the Manitoba Live Stock Breeders' Associations at Brandon. Secretary, W. I. Smale, exhibition offices, Arena, Brandon, Man.

January 13, 1921. The annual meeting of the Nova Scotia Poultry Association at Truro. Secretary, J. P. Landry, Agricultural College, Truro.

January 19 and 20. Dairymen's Association of Nova Scotia, eighth Annual Convention and Creamery Butter Exhibition; Bridgewater, Nova Scotia.

January 19, 20, 21, 1921.—The Annual meeting of the British Columbia Fruit Grower's Association at Nelson. Secretary, W. A. Middleton, Vancouver, B.C.

January 25, 1921. Saskatchewan Horse Breeders' Association, Moose Jaw, Sask. Secretary, J. G. Robertson, Regina, Sask.

January 26, 1921. Saskatchewan Cattle Breeders' Association, Moose Jaw, Sask. Secretary, J. G. Robertson.

January 26, 1921. General Meeting of Live Stock Organizations, Moose Jaw, Sask. Secretary, J. G. Robertson.

January 27, 1921. Saskatchewan Sheep Breeders' Association, Moose Jaw, Sask. Secretary, J. G. Robertson.

January 28, 1921. Saskatchewan Swine Breeders' Association, Moose Jaw, Sask. Secretary, J. G. Robertson.

February 3. Ontario Vegetable Growers' Convention, Toronto. Secretary, J. Lockie Wilson, Parliament Buildings, Toronto.

February 7, 1921. Ontario Berkshire Club, annual meeting. Secretary, R. W. Wade, Toronto, Ont.

Canadian Thoroughbred Horse Society, Annual Meeting, Secretary. T. J. Macabe, Toronto, Ont.

Canadian Swine Breeders' Association, annual meeting. R. W. Wade.

Canadian Pony Society, annual meeting. Secretary, G. de W. Green, Toronto, Ont.

Ontario Yorkshire Club, annual meeting. Secretary, R. W. Wade.

February 8, 1921. Ontario Swine Breeders' Association, annual meeting. Secretary, R. W. Wade.

Dominion Shorthorn Breeders' Association, annual meeting, Prince George, Sask. Secretary, Geo. H. Day, Guelph, Ont.

February 8, 1921. Canadian Sheep Breeders' Association, annual meeting. Secretary, R. W. Wade.

Canadian Trotting Association, annual meeting. Secretary, W. A. McCullough, Toronto, Ont.

Canadian Standard Bred Horse Society, annual meeting. Secretary, John W. Brant, Ottawa, Ont.

February 9, 1921. Ontario Ranchers' Association, annual meeting, Toronto, Secretary, C. M. Laidlaw.

Ontario Horse Breeders' Association, annual meeting. Secretary, R. W. Wade.

Canadian Jersey Cattle Club, annual meeting. Secretary, B. A. Bull, Brampton, Ont.

Ontario Sheep Breeders' Association, annual meeting. Secretary, R. W. Wade.

Canadian Hackney Horse Society, annual meeting. Secretary, H. M. Robinson, 883 Broadview Ave., Toronto, Ont.

Canadian Kennel Club, annual meeting. Secretary, J. E. Strachan, Toronto, Ont.

February 10, 1921. Canadian Shire Horse Association, annual meeting. Secretary, G. de W. Green.

Clydesdale Horse Association of Canada, annual meeting. Secretary, J. W. Wheaton, Toronto, Ont.

Canadian Brown Swiss Association, annual meeting. Secretary, Ralph H. Libby, Stanstead, Que.

Canadian Hereford Breeders' Association, annual meeting. Secretary, H. D. Smith, Ancaster, Ont.

February 8 and 9. Ontario Fairs and Exhibitions Convention, Toronto. Secretary, J. Lockie Wilson, Parliament Buildings, Toronto.

February 10-11. Ontario Horticultural Association's Convention, Toronto. Secretary, J. Lockie Wilson, Parliament Buildings, Toronto.

February 11, 1921. Ontario Cattle Breeders' Association, annual meeting. Secretary, R. W. Wade.

ASSOCIATIONS AND SOCIETIES

SILVER FOX EXHIBITION

An exhibition of silver foxes was held in Montreal on November 24, 25, and 26, under the auspices of the Wild Life Branch of the Commission of Conservation. The exhibition was organized and managed by Mr. F. C. Nunnick, Agriculturist of the Commission. The show was financially supported by the Dominion Department of Agriculture and the Governments of the provinces of Prince Edward Island, Quebec, Nova Scotia, New Brunswick and Ontario. The classification provided for four divisions: first, black and extra dark; second, dark silver; third, medium silver, and fourth, light and dark silver. These were further subdivided into sixteen classes according to colour and age. The entries numbered four hundred and eighty-five, but only about three hundred and sixty animals could be accommodated. The entries were chiefly from Prince Edward Island, but animals were also present from Nova Scotia, New Brunswick, Quebec, and a small number from the United States. The objects of the exhibition were to bring to the attention of the public the importance of the fox-rearing industry, and to bring together breeders and ranchers for the development of the industry on sound, uniform lines.

THE POMOLOGICAL AND FRUIT GROWING SOCIETY OF QUEBEC

The annual meeting of the Pomological and Fruit Growing Society of the province of

Quebec, was held at Macdonald College early in December. Among the resolutions passed was one urging that the Minister of Agriculture extend the area of land attached to Macdonald College and devoted to horticulture, this extension being necessary to carry on breeding work in apples and other fruits.

The following officers were elected: President: J. H. Lavoie, Department of Agriculture, Quebec; Vice-President: H. J. Marshall, Abbotsford, Que.; Secy.-Treasurer: Peter Reid, Chateauguay Basin, Que.

QUEBEC LIVE STOCK ASSOCIATION SALE

The annual sale of pure-bred live stock held by the General Live Stock Association of the province of Quebec took place at Three Rivers in October. The sale included 222 head made up of 55 cattle, representing Canadians, Ayrshires and Holsteins; 177 sheep of the Leicester, Cotswold, Lincoln, Oxford, Shropshire and Hampshire breeds and 50 hogs of the Yorkshire, Chester and Tamworth breeds. All but six of the cattle were under two years of age. The average prices received were for Canadian cattle \$67, Ayrshires \$100, and Holsteins \$67.33. The average sheep prices were: Leicesters \$34, Cotswolds \$24, Lincolns \$17, Oxfords \$44, Shropshires \$35.50, Hampshire \$28.50. The swine sold for \$43.62 for Yorkshires, \$38 for Chesters, \$17 for Tamworths.

The association purchases the animals and sells them at auction without reserve. This year's sales left a deficit for the Department of Agriculture to meet. The purchasers included fifty-one individuals and forty-three associations.

THE CANADIAN CREAMERY ASSOCIATION OF ONTARIO

At the annual Convention of the Canadian Creamery Association held in Toronto on December 9 and 10, resolutions were passed urging the Provincial Government to have the creamery instructors and assistant butter graders, devote their winter months to inducing farmers in many localities to build ice-houses and cream cooling-tanks, and to hold meetings on these farms in hot weather to demonstrate the effectiveness of the ice-houses and cooling-tanks; approving the work of the National Dairy Council for the betterment of dairying conditions in Canada, and the methods of raising revenue adopted by that council; opposing further extension of the manufacture, sale or importation of oleomargarine into Canada; favouring a system of a Federal mark on all Canadian butter for export, on the grade certificate of the various province; requesting the Provincial Government to provide at Guelph and Kingston, an annual six days' course for operating buttermakers, conducted by a practical, scientific, outside man, approved by this association; approving the proposal to erect a suitable dairy building in connection with the Ontario Agricultural College, and urging the importance of the work being completed during the coming year; urging the Provincial Legislature to make operative the Dairy Standards Act, with such amendments as are in the best interests of dairying.

The following officers were elected: President, W. M. Waddell, Strathroy; First Vice-President: R. M. Player, Walkerton; Second Vice-President: G. A. Gillespie, Peterboro'; Sec.-Treas.: H. S. Johnston, Lindsay; Representative to National Council: Mack Robertson.

[ONTARIO] WOMEN'S INSTITUTES

The Women's Institutes of the province of Ontario have organized a system whereby the various major activities undertaken are dealt with by representative committees. The major activities include agriculture, home economics, immigration, education and better schools, and publicity.

Agriculture is covered under two headings, education and practical work directed under the convenorship of Mrs. R. G. Legget, Newboro. In this division school boards will be encouraged to supply suitable grounds for school gardening and the proper training of teachers to direct the garden work.

Improvement of school grounds and recreation centres are also taken care of. Under practical work, women are encouraged to take up gardening, poultry raising, bee-keeping, etc., to create market centres for their products and to improve the surrounding of Canadian homes.

The home economics is under the direction of Miss U. M. Watson of Guelph. It is the duty of the home economics committee to recommend lines of work to be included in the demonstration lecture courses; to recommend suitable books for the study of women's institute workers, and through the Dominion federation committee, and to urge upon the Federal Department of Health the necessity of dealing with home economics and allied matters.

Miss D. M. Sutherland, Toronto, is convenor of the immigration committee. Their programme includes the keeping track of immigrant families that settle in the province through such Government agencies and bureaus as deal with this matter.

Education and better schools are in charge of Miss K. F. McIntosh, Home Demonstrator, Brampton, Ontario. The work to be undertaken will be done through home and school clubs and will work for the improvement of schools and more especially for the education of retarded and illiterate children and those that are without the English language.

The publicity programme is in charge of Miss Ethel Chapman of Toronto. It is the duty of this committee to supply institutes with material for demonstration lecture courses and other extension work.

THE INTERNATIONAL CROP IMPROVEMENT ASSOCIATION

A meeting of the International Crop Improvement Association was held in Chicago early in December. The International Crop Improvement Association is a federation of Crop Improvement Associations composed at present of several state associations of the United States, and the Canadian Seed Growers' Association of Canada. The purpose of this association is to promote closer relations between the crop improvement associations of various sections of the country, in order that we may have more uniform standards of inspection and types of grades of seed for distribution.

At the Chicago meeting a committee of six members was appointed to work out standard terms for various grades and kinds of inspected seed, so that terms such as "registered seed" and "certified seed," will have a common meaning in all parts of the United States and Canada. This committee will recommend a standard system of seed propagation, inspection and distribution by associations. The committee includes

the secretaries of The Wisconsin Alfalfa Growers' Association, The Michigan Crop Improvement Association, The North Dakota Alfalfa Growers' Association, The Idaho Seed Growers' Association, The Indiana Seed Growers' Association, and Mr. L. H. Newman, Secretary of the Canadian Seed Growers' Association.

The officers for the ensuing year were elected as follows:—President, G. H. Cutler, Professor of Field Husbandry in the University of Alberta; Vice-President: R. A. Moore, Madison, Wis.; Second Vice-President: B. F. Sheehan, Boise, Idaho; Third Vice-President: A. L. Bibbins, East Lansing, Mich.; Secretary-Treasurer: J. W. Nicolson, Lansing, Mich.

CANADIAN SEED GROWERS' REGULATIONS

Mr. L. H. Newman, Secretary of the Canadian Seed Growers' Association, calls attention to the amendments made at the latest meeting of the association to the regulations covering the registration of seed. Previously no seed could be registered which was more than three years removed from elite stock seed. It is now permissible for any farmer to secure and show registered seed and have each succeeding generation registered without limit so long as he is able to maintain the purity and quality of the stock.

CANADIAN RED POLLED ASSOCIATION

The four western provinces were represented at the annual meeting of the Canadian Red Polled Association held recently at Calgary, when it was decided to adopt standards for qualification in the Record of Performance, so as to give the breeders an opportunity to have their cows officially tested for milk and butter fat under the supervision of the chief inspector for record of performance at Ottawa. This test will be available to breeders as soon as standards are approved by the federal department of agriculture.

The following officers were elected:—President: W. J. McComb, Beresford, Manitoba; Vice-President: J. H. Elliott, Irma, Alberta; Secretary: P. H. Hoffman, Amahein, Sask.

ENTOMOLOGICAL SOCIETY OF ONTARIO

At the annual meeting of the Entomological Society of Ontario, the following officers were elected for 1921:—President: Arthur Gibson, Dominion Entomologist, Ottawa; Vice-President: F. J. A. Morris, Peterboro; Secretary-Treasurer: A. W. Baker, O.A.C., Guelph; Curator and Librarian: G. F. Spencer, O.A.C., Guelph. Directors:—District No. 1, J. M. Swiane, Department of Agriculture, Ottawa; No. 2, P. E. Grant, Orillia; No. 3, Dr. A. Cousins, Toronto; No. 4, Dr. Watson, Port Hope; No. 5, J. W. Noble, Essex; No. 6, J. F. Henderson, Strathroy; No. 7, W. A. Ross, Vineland Station.

QUEBEC BEE-KEEPERS' ASSOCIATION

The annual meeting of the Quebec Beekeepers' Association was held in Montreal in November. The following officers were elected:—President: J. F. Prud'homme, Ste. Philomène, County of Chateauguay; Vice-President: J. O. Levac, Rigaud, County of Vaudreuil; Sec.-Treasurer: Armand Prud'homme, Ste. Philomène, County of Chateauguay.

THE CANADIAN SOCIETY FOR THE PROTECTION OF BIRDS


The annual meeting of the Canadian Society for the Protection of Birds was held in Toronto on December 18. The feature of the meeting was an address by Mr. Maughan, Director of Biology and Hon. Curator of the Provincial Museum, on phases of bird life, illustrated with black-board sketches and lantern slides. The following officers were elected:—President: D. A. Dunlap, Toronto; Vice-Presidents: Dr. J. N. E. Brown, and Charles S. Fraser; Provincial Vice-Presidents: Manitoba, D. H. M. Speechly, President of the Natural History Society; Saskatchewan: A. J. McCullough, Inspector of Public Schools; British Columbia: J. H. Scholfield, M.P.P.; Quebec: W. C. Hall, superintendent of the National Laurentide Park; Nova Scotia: Dr. A. H. Mackay, Superintendent of Education; Secretary: Miss Laura B. Durand, Toronto; Treasurer: E. Brook Daykin, Toronto.

NEW PUBLICATIONS

DOMINION DEPARTMENT OF AGRICULTURE

Report of the Minister of Agriculture, Canada, for the year ending March 31, 1920.—The report comprises a summary of the operations of the different branches of the Department, including the Experimental Farms and Stations; also a list of agricultural enactments during the period. There is an appendix recording the transactions of the conference of representatives of Federal and Provincial Departments of Agriculture, held at Ottawa March 17-19, 1920.

The Canadian Record of Performance for Pure-Bred Dairy Cattle.—Report No. 12. This report, which is issued by the Branch of the Live Stock Commissioner, contains the Rules and Regulations governing the Record of Performance Tests; Standards for Registration; list of animals qualifying, and Index to Owners.

Studies in North American Cleorini (Geometridae), Bulletin No. 18 (Technical) by Dr. J. H. McDunnough, Division of Systematic Entomology. This bulletin, prepared for systematists is a scientific contribution resulting from studies of material in the National Collection of insects. It comprises 64 pages, including eleven plates of illustrations. These latter show genitalic and other structural characters as well as the adults of a number of the species. 

QUEBEC

The Province of Quebec and its Possibilities is the title of a volume issued by the Department of Agriculture, Quebec, which gives a general review of the natural resources of the province. The agricultural conditions and possibilities of the province occupy most of the book.

ONTARIO

Alfalfa.—Bulletin No. 280 of the Ontario Agricultural College, by Dr. C. A. Zavitz, Professor of Field Husbandry and Director of Field Experiments, covers the results of the experimental work done at the college with alfalfa, and outlines a satisfactory system of culture.

The Ontario Agricultural College.—The forty-fifth Annual Report of the Ontario Agricultural College and Experimental Farm 1919, reviews the history of the institution, describes the courses given, and the extension and experimental work carried on.

The Annual Report of the Corn Growers' Association, 1919, contains a list of the officers of the association, the financial statement, and a report of the annual meeting and show held in Chatham in January, 1920.

Report of the Minister of Agriculture.—The period covered in this report is for the year ending the 31st of October, 1919, and constitutes a review of the activities of the Ontario Agricultural College, and of the Provincial Department.

Horticultural Experiment Station.—This report for 1919 covers the new projects and such other major projects as are of interest to practical horticulturists. The more important work reviewed related to peach and strawberry breeding work; to greenhouse cucumber breeding; to apple pruning experiment; to tomato variety tests; to investigations with canning, and soil fertility experiments.

The Entomological Society.—The Fiftieth Annual Report of the Entomological Society of Ontario for 1919 deals principally with the report of the convention held at Ottawa that year.

Better Bulls.—Bulletin No. 281 of the Ontario Department of Agriculture has been prepared for the purpose of placing before the men who are raising cattle in the province of Ontario, facts in regard to the use of improved sires, and the work carried on by various agencies for the general improvement of live stock.

SASKATCHEWAN

The Report of the Live Stock Commissioner of Saskatchewan, for the year ending April 30, 1920, reviews the condition of the live stock industry, and covers the work done by the Branch in live stock distribution, stallion enrolment, and the work of the branch to control disease.

ALBERTA

The Department of Education.—The annual report of the Department of Education of Alberta for 1919 contains the Report of the Deputy Minister, the Supervisor of Schools, the Chief Inspector, the Assistant Deputy Minister, the Director of Technical Education, and the general educational statistics of the province.

BRITISH COLUMBIA

Pruning Fruit Trees.—Circular No. 60 of the Horticultural Series issued by the Department of Agriculture of British Columbia, deals with the pruning of young and mature fruit trees, and the treatment of neglected trees. The apple and pear and the stone fruits are discussed.

MISCELLANEOUS

Dominion Shorthorn Herd Book, Volume XXXVII, 1920.—Issued from the office of the Canadian National Live Stock Records, Ottawa. The volume contains pedigrees as follows:—Bulls, 136001-141700; cows, 156501-164800, together with a list of the officers and members of the Dominion Shorthorn Breeders' Association.

Dominion Shorthorn Herd Book, Volume XXXVI, 1919.—Issued from the office of the Canadian National Live Stock Records, Ottawa. The volume contains pedigrees as follows:—Bulls, 126250-136000; cows, 143360-156500, together with a list of the officers and members of the Dominion Shorthorn Breeders' Association.

Canadian Hereford Herd Book.—Volume II of the Canadian Hereford Herd Book has just been issued from the office of the Canadian National Live Stock Records, Ottawa. It contains pedigrees 33,605 to 38,233 inclusive. Also a report of the annual meeting held February 5, 1920, a copy of the constitution and by-laws as amended February, 1917, and a list of members of the Canadian Hereford Breeders' Association, publishers of the Herd Book.

Western Canada Live Stock Union.—The proceedings of the seventh annual convention of the Western Canada Live Stock Union are recorded in the report for 1919, which covers the meeting of the union held in British Columbia in November, 1919. The Secretary of the Union is E. L. Reicharson, Calgary, Alta.

"The Manitoba Agricultural Extension News" is the title of a new monthly publication of the Manitoba Department of Agriculture and Immigration, the first issue of which appeared in November. As the name implies, the publication will constitute a news service for such activities as Boys' and Girls' Clubs, Seed Fairs and other projects carried on under the auspices of the Extension Branch of the Department.

"World Agriculture."—This quarterly journal, which forms a recent addition to the list of agricultural publications, will print official news of the "World Agricultural Society," and of the following organizations among others:—

The International Institute of Agriculture;
The A.E.F. Farmers' Club;
The American Country Life Association;
The Beaune Committee of World Co-operation on Agriculture and Country Life;
La Société des Agriculteurs de France;

The International Association of Agricultural Missions.

The World Agricultural Society is a fellowship of individuals and organizations interested in the world aspects of agriculture and country life. Its fundamental aim is the promotion of a better understanding in matters connected with production, distribution and consumption of agricultural products.

The Society is an outgrowth of the Conference on World Agriculture held at the A.E.F. University, Beaune, France, in June, 1919. It welcomes individuals and organizations who desire to join. Subscription rates are \$3 per annum to non-members and \$2 to members. Enrolments and subscriptions should be sent to the Secretary, World Agriculture Publication Committee, Amherst, Mass., U.S.A.

The Canadian Society of Technical Agriculturists: There has been published a report of addresses and discussions at the organizing convention of the Society held in Ottawa in June, 1920. The report is edited by the secretary of the Society, Mr. Fred H. Grindley, Gardenvale, Que.

NEW BRUNSWICK

Department of Agriculture: The annual report of the Department of Agriculture of New Brunswick for the year ending October 31, 1919, gives an account of the work accomplished by the department by branches and divisions.

NOTES

At the International Exposition held in Chicago in November, 1920, Canada won twenty-one out of twenty-five prizes in wheat and oats.

Rev. Charles J. S. Bethune, M.A., who for fifteen years has been Professor of Entomology at the Ontario Agricultural College has resigned. Dr. Bethune has retired to private life.

In the province of Manitoba more than one hundred consolidated schools are in operation. The largest of the consolidated schools, situated at Dauphin, is a fully graded school with twenty teachers.

The Agricultural Representative for Megantic County, Quebec, reports that the clover seed growing industry, which was commenced in 1916, last year produced twenty thousand pounds of seed.

In the province of Manitoba two hundred and twenty-nine school fairs were held in 1920. The number of children exhibiting are estimated to have been about twenty-one thousand.

G. S. Johnson, who for the past five years has been principal of the Whitby High School, has left to assume the principalship of the Northern Academy at Monteith, in New Ontario.

In Wellington county, Ontario, a Farmers' Club has purchased a potato cellar as well as a building for meetings and office work, while another club in the county has obtained a suitable building for a warehouse and store.

Canadian Farm Products, Ltd., Prince Edward Island, last spring distributed seventeen thousand chicks from its local hatchery at Charlottetown, from eggs produced by government inspected pure bred flocks.

Mr. Harvey Mitchell, of Keswick, N.B., former dairy inspector for the Federal Government, has been appointed Deputy Minister of Agriculture for the province of New Brunswick in succession to E. P. Bradt.

In Brant county, Ontario, a five acre plot has been selected for reforestation, in accordance with the policy recently announced by the Minister of Agriculture. The land, which is a very light sand, is situated on the main-travelled road.

The formal opening of the Kemptville Agricultural School will take place on February 18. The Hon. M. W. Doherty, Minister of Agriculture for Ontario, and the Honourable S. F. Tolmie representing the Dominion Department will be present.

A dairy club has been organized amongst the students of the Ontario Agricultural College. The purposes of the club are similar to those of the existing animal husbandry, horticulture, apiculture, poultry and biology clubs.

Honourable J. E. Caron, Minister of Agriculture for the Province of Quebec, recently made the announcement, that a measure would be brought down at the next session of the Legislature to make it obligatory to pay for milk according to the quantity of fat contained therein.

The Lambton county, Ontario, Beekeepers' Association is inaugurating a movement to stamp out foul brood in bees. They purpose employing an inspector to locate and destroy diseased colonies. A fund of \$1,000 is being raised locally to assist in carrying out this work.

The Alberta Department of Agriculture has succeeded in securing a Percheron stallion of superior quality for the use of horse breeders in the province. The animal purchased is "Job," bred in France, and for a number of years at the head of the breeding farm of Mr. Dunhams, Wayne, Ill. "Job" is eleven years old and has a most successful breeding record. The price paid was \$8,000.

The Agricultural representative for Brant county, Ontario, has appointed an advisory council with respect to work in the county. Five township live stock conventions are to be held during the winter. The advisory council will assist in securing the necessary live stock for demonstration purposes. Four farm power courses are also to be held, as well as a sheep and swine course.

Two appointments have recently been made by the New Brunswick Department of Agriculture. Mr. George Thimens has been promoted from Assistant Dairy Superintendent to Dairy Superintendent, succeeding Mr. H. W. Coleman, resigned. Mr. J. H. King, Agricultural Representative at Moncton, has been promoted to the office of Live Stock Superintendent, in the Department of Agriculture at Fredericton.

The Honourable D. W. Mersereau, M.L.A., has been appointed Minister of Agriculture for the province of New Brunswick, succeeding the Honourable Mr. Tweeddale. Mr. Mersereau was for many years prominent in municipal politics, representing the parish of Gladstone in the county of Sunbury as county councillor. He owns and operates a farm at Fredericton Junction. Mr. Mersereau has been chairman of the agricultural committee of the Legislature.

A class of students representing the University of British Columbia, in charge of Professor Clement, competed in stock judging at the Pacific International Exposition at Portland, Oregon. The British Columbia class won second prize against Oregon which won first, Washington which won third, and Idaho fourth. The British Columbia team won first in judging Jerseys, second in judging Holsteins, and third in judging Guernseys.

Macdonald College has instituted a new department of Botany which will give special training to agricultural students desirous of specializing in plant pathology. This new departure is designed to meet the demand for specialists in plant diseases to cope with the problem of farmers, fruit and vegetable growers, and florists, and to endeavour to prevent the heavy losses that are suffered every year from the ravages of plant diseases.

This year's enrolment at the Nova Scotia Agricultural College is eighty-nine regular students and nine special soldier students. The eighty-nine regularly enrolled students come from the following provinces and countries:—Nova Scotia, forty-four; New Brunswick, thirty; Prince Edward Island, seven; Newfoundland, five; England, three. Approximately half the students come from the province of Nova Scotia and the greater part of the other half from the two provinces of New Brunswick and Prince Edward Island.

A number of changes have occurred in the staff of the Macdonald College: Miss A. E. Hill, head of the School of Household Science, is succeeded by Miss Bessie M. Philip. Miss Philip is succeeded, as instructor in cooking, by Miss M. M. Chute, formerly superintendent of Women's Institute for Quebec. Dr. Gordon M. McRostie, a graduate of the Ontario Agricultural College and of Cornell University, has joined the staff of the Cereal Husbandry Department. Mr. M. A. Jull, head of the Poultry Department, is taking a post-graduate course at the University of Wisconsin. He is succeeded in the meantime by Mr. W. A. Maw, a graduate of 1920. Mr. L. H. Hamilton, a graduate of the Ontario Agricultural College, has been placed in charge of the extension work in Animal Husbandry. Mr. S. R. M. Hodgins, a 1920 graduate, is the editor of the *Journal of Agriculture* and lecturer in journalism at the College.

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The development of the co-operative spirit and all that it stands for, and the creation of a rural civilization—these things are among the greatest needs of our time, says J. Nugent Harris, late General Secretary to the Agricultural Organization Society of England and Wales. He continues:—

To use the illustration of the brilliant editor of the *Irish Homestead*—"Let a fisherman trawl the seas with one loop of cord and it may be ages before he secures a fish, but let him unite a thousand loops of cord in a net and trail the seas and he will draw it in shining with herring or mackerel. Man has to learn the same lesson, he points out, about the forces of nature. They will not yield to the individual. He cannot draw them down though they are all about him. But let him unite with a thousand others and he can build ocean liners, and make the cathedral spire rise to heaven. He can, if he will, gather the harvest of the powers which have waited for such unity to yield themselves to man from the beginning of the world."

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to
T. K. Doherty, International Institute Commissioner, Department of
Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

International Year Book of Agricultural Legislation, 1919.—1,130 pages. (Text in French only, with an analytical introduction and index in English). *International Institute of Agriculture*, Rome, Italy, 1920.

The International Institute of Agriculture has just published the customary Year Book of Agricultural Legislation for 1919, containing information which is of very considerable interest inasmuch as it gives an account of the measures adopted in many different countries for coping with problems of the transition period from a state of war to one of peace.

The world legislation of 1919, if studied in its broader aspects, must be completely differentiated from that of the period immediately preceding. During war time the great bulk of enactments were essentially transitory in their nature, intended to ensure for the benefit of the populations the effective use of the supplies coming to hand. These enactments took in most cases the form of State intervention to prevent absolutely any exportation of domestic produce and to fix, by means of Government action, maximum prices for essential articles of consumption.

But in 1919 Parliaments and Governments were confronted by problems of wider significance. The most serious question was that of agricultural reform, which was dealt with, notably in newly founded States, by measures of far reaching character. The question had to be settled in duplex fashion in order on the one hand to stimulate production and on the other to put an end to the age-long disputes between peasant and landowner. We may instance, in this connection, enactments in Germany, Denmark, Esthonia, Great Britain and Ireland, Poland, Roumania, Serbia and Czechoslovakia.

The high prices of essential articles are the subject of sundry measures sanctioned during 1919; among such were the Profiteering Act in Great Britain, the Spanish law against undue holding, the Victorian enactment against exorbitant profits, the two Canadian measures as to trading commissions and undue holding of stocks. But any of these measures may be favourably contrasted with the war time provisions, indicating as they do a widening conception of the points at issue, with some endeavour to ascertain the causes of the irregularities, and to attack these causes at the fountain head, instead of attempting to deal merely with their results.

The consideration of Parliaments and of Governments in several countries was also required in 1919 for the official organization of agricultural associations. These local bodies serve to represent the farming interests in their respective localities and to communicate their opinions to the central administration. Notable instances of such measures occurred in France and the French Colonies, in Spain, in Greece, in Tripoli and Cyrenaica.

The important question of popular insurance also absorbed much attention in the various legislatures during 1919. Spain has initiated a system of workmen's old age pensions; Italy has made it obligatory to ensure against disability, old age and unavoidable unemployment. Portugal has sanctioned obligatory insurance against sickness, labour risks, disability and old age, and has founded a Popular Insurance Institute for carrying these objects into effect.

In conclusion, the delicate and complex subject of relations between labour and capital occupied much space in the records of legislation during 1919. The subject is complicated by the divergent forms which such relations may assume when legally interpreted, and by the varying effects resulting from State intervention; its delicate

nature, particularly at the present time, arises from the conflicting interests so immensely difficult to reconcile. We confine ourselves to the mention of the French and English legislation as to defective agricultural agreements, of the French law as to collective labour bargains, of the Spanish and Portuguese enactments as to labour exchanges, of the Greek provisions as to house accommodation for leaseholders, and of the Italian decrees setting up commissions for dealing with the controversies arising from the conditions of agricultural work.

The Year Book may be obtained from the Secretary-General, International Institute of Agriculture, Rome, Italy, for 15 francs.

Mr. T. K. Doherty, delegate of Canada at the General Assembly of the International Institute of Agriculture, held at Rome on November 3rd to 10th last, suggested that the whole of this Year Book be translated into English instead of merely the introduction as at present. This suggestion was favourably received, especially by the English speaking delegates, and it is quite possible that in the course of next year, translations will be prepared and made available for both the 1919 and the 1920 editions. It is possible that the 1920 edition will be translated and distributed in sections, pending completion of the full volume.

810.—**Digestibility of Protein Supplied by Soy-Bean and Peanut Press-Cake Flours; Experiments in the United States.**—HOLMES, A. D., in *U. S. Dept. Agr. Bulletin*, No. 717, p. 28, Bibliography of 22 publications. Washington, September 25, 1918.

The writer considers that soy-bean and peanut flours, being rich in proteins that are very digestible and of high biological value, should prove valuable additions to the human dietary.

CROPS AND CULTIVATION

815.—**A Field Study of the Influence of Organic Matter Upon the Water-Holding Capacity of a Silt-Loam Soil.**—ALWAY, F. J., and NELLER, J. R., in the *Journal of Agricultural Research*, Vol. XVI, No. 10, pp. 263-278. Bibliography of 12 works. Washington, March 10, 1919.

There exist very few data as to the influence of organic matter upon the water-holding capacity of soils. The investigations of the writer have contributed to our knowledge of the subject. His paper reports a detailed study of the moisture conditions of two adjacent plots at the Minnesota Experiment Station. In both plots, the soil was a silt loam, very uniform in texture, but differing widely in content of organic matter, as the result of great differences in cultural

treatment. During the cool wet summer of 1915, the surface foot, and this alone, showed a very marked difference in moisture content, especially in available moisture, the soil which was the richer retaining the most water. In the warmer and somewhat drier summer of 1918, however, when winter rye was grown, much smaller differences were found.

It is therefore concluded that, in the case of a finer textured soil, with a fine-textured subsoil, and a comparatively level surface, the differences in the water-holding capacity that may be caused by differences in manuring, or in cultural operations, exert but little influence upon the productivity.

821.—**The Use of Explosives in Agriculture.**—I. BRUTTINI, A., in *L'Agricoltura italiana illustrata*, Year 1, No. 4, pp. 21-31, April 25, 1919.—II. IDEM, *Ibid.*, No. 6, pp. 33-38. Milan, June 25, 1919. III. LARUE, P., in *Le Progres agricole et viticole*, Vol. LXXII, No. 36, No. 27, pp. 14-18. Montpellier, July 6, 1919.

Economic Expediency of the Use of Explosives.—Some people hold that it is not economically possible to use explosives in agriculture. This may be true of the ordinary trenching of an entire area either superficially or into the subsoil, in which case a large quantity of explosive is required. But if the displacement of the soil is limited to narrow strips for scooping out ditches or small patches, for opening up holes, for planting trees, for digging out drainage pits or for extracting the stumps of trees, there is economic expediency in using explosives even if their cost is rather high.

Agricultural Explosives.—Of the very great number of explosives that are known a few only are suited for use in agriculture, for which purpose they should combine power and rapid expansion, be easily transported, easily preserved, easily handled and of moderate cost. If ordinary black mining powder, which is not powerful enough and which decomposes in moist soil, is eliminated, 3 kinds of explosive can be used in agriculture: dynamite and other explosives derived from nitroglycerin; explosives made from chlorate of potash or perchlorates; safety explosives from nitrate of ammonia. Dynamite which explodes also under water is very useful in wet ground. Ordinary low standard dynamite containing 20-25% of nitroglycerine does quite well for agriculture. Chlorate of potassium and perchlorate of ammonia powder, which are very violent, can be used for breaking up a rocky subsoil or for blasting big rocks scattered over the surface of arable ground, but they do not suit ordinary ground or tree planting. The author considers that nitrate of ammonia explosives can be used in agricultural work because they are very safe.

In the article in the Institute Bulletin the author gives detailed instructions for the preservation and use of explosives, then he deals with the clearing and working of the soil with explosives under the following heads: (1) Clearing the surface or grubbing up the subsoil; (2) working bare or planted ground; (3) scooping out ditches; (4) opening holes in the subsoil for drainage in marshy ground; (5) stumping in dis-afforested land; (6) breaking up rocks on the surface.

There are further uses of an indirect character;—enriching the soil with fertilizers: destruction of moles, rats and insects infesting the soil, and of fungi injurious to plants, by means of poisonous fumes produced by explosions. The explosion causes a spheroidal cavity from which fissures radiate in all directions, but in clay soils, especially if they are very wet, the explosion throws particles from the centre to the pores of the surrounding ground and thus a cavity with hard compact walls is produced; the soil, instead of being reduced to fragments and fissured, is compacted and in worse physical condition than before the explosion. The use of explosives cannot therefore be recommended for wet clay soils.

Explosives disintegrate deep strata in all directions; they facilitate the work of farm implements and make the soil porous and absorbent to its greatest depths. In orchards explosives can replace deep digging if placed at suitable intervals between the trees.

Fissures in the soil facilitate the penetration of water and so in certain cases irrigation can be dispensed with.

The author notes results in various countries of the successful use of explosives in the preparation of fields, kitchen-gardens, vineyards, orchards and colonial plantations.

Scooping out of Ditches and Draining.—Displacement of soil with the help of explosives makes it possible to scoop out the ditches with simple labour with spade and shovel. In the direction which the ditch is to have, slightly inclined (25° to 45°) holes are bored 24 to 28 inches apart; the bottom of the bore should be 6 to 8 inches above the bottom of the ditch that is to be made. A single dynamite cartridge is placed in each hole except the middle one in which 2 or 3 cartridges are placed. The central charge is fired and causes the others to explode. With a single row of cartridges in not too hard ground ditches 5 ft. in width at the top, 3 ft. at the bottom and from 3 ft. to 5 ft. in depth can be obtained.

With 2 or 3 rows of cartridges in parallel holes ditches 16 ft. in width at the top, and 5 ft. in depth can be made.

A similar procedure is followed for making holes for planting trees. Explosives have proved very useful for draining marshy or

wet land through the subsoil by breaking through to a permeable stratum.

Breaking up Stumps and Rocks.—The most practical method of getting rid of stumps (especially big ones with strong roots) is by means of explosives. The charge is placed under the stump in a hole inclined at an angle of about 45° , at the point of greatest resistance and at a sufficient depth. Dynamite containing 25% of nitroglycerine and of slow action is the best for this work. Trees may also be felled by surrounding the trunk with a girdle of cartridges. To calculate the amount of explosive required the English method is as follows: after calculating the square of the circumference of the stump, this is divided by 3 if the tree has small roots, by 2 for trees well furnished with roots; no division is made in the case of trees with numerous very large roots. The quotient so obtained gives the number of ounces of dynamite (containing 25% of nitroglycerine). On the other hand some experimenters have found that for similar stumps and in similar ground the quantity of dynamite varies with the square of the diameter of the stump.

The author gives some technical details of the different operations and mentions some experiments also quoted by Professor Bruttini.

832.—Alsation Salts of Potash.—I. BEAUVÉRIE, J., *Revue d'Agronomie*, Second part, 5 Potash. *Revue generale des Sciences pures et appliquees*, Year XXX, No. 13, pp. 411-412, Paris, July 15, 1919. II. *Communiqué du Bureau provisoire de Vente de la Potasse d'Alsace*. Mulhouse, July 10, 1919.

I. An estimated value of 50 thousand million francs is certainly not too high for the Alsation potash deposits. When the war broke out the shafts sunk were almost all ready for exploitation and owing to the purity of the product they might have yielded in 1917 almost the same amount as central Germany, which considerably exceeded the French consumption. Measures have been taken since the beginning of 1919 to furnish French agriculture with as much Alsation potash fertilizer as it needed, without administrative formalities. Already, during the early months of 1919, there was an output of 3,000 to 6,000 tons of Alsation potash per week.

II. The mines of potash salts in Alsace are situated in the plain of Upper Alsace between the villages of Wittenheim, Wittelsheim, Staffelfelden, Bollwiller and Ensisheim. The potash salts are found in two beds separated by 20 m. of rocksalt. The lower bed, the only one worked, is the more important and ceases at a varying depth of 450 m. to 680 m.; it has a thickness of 2.5 m.—5.5 m. over an area of 200 sq. km.

According to the estimates of official geologists this bed alone contains two thousand million tons of potash salts, equivalent to 300 million tons of pure potash, or several hundred times the annual pre-war world consumption. The two beds of Alsatian potash are composed of sylvinite, that is to say of a mixture of sylvine (chloride of potassium) pure and crystallized, and of rock salt (chloride of sodium). At present 17 shafts are worked and others are under construction, so that the annual production can be increased to 1,200,000 tons. These shafts furnish two qualities of salt of different value: crude sylvinite, or sylvinite (kainite) containing 19 to 25% of chloride of potassium, and rich sylvinite (manure salt) containing 32 to 35% of chloride of potassium. These two salts are placed on the market crushed but untreated. After factory treatment, required for concentration, they attain a purity of 80 to 95% of chloride of potassium and constitute commercial chloride of potassium.

833.—Research on the Fertilizing Value of "Kalikalk," a New Potash Fertilizer, in Sweden.—SÖDERBAUM, H. G., in *Meddelande*, No. 163, Stockholm, 1918; summarized by CRISTENSEN, H. R., in *Tidskrift for Planavl.*, Vol. 26, Part I, pp. 186-187. Copenhagen, 1919.

A potash fertilizer is now sold in Sweden under the name "Kalikalk" (lime potash) which is made by crushing together felspar, limestone and gypsum, the mixture being then calcined at a temperature of 1150°C.

The author has tested the value of three samples of "Kalikalk" containing varying proportions of its ingredients. The potash (K_2O) content was between 5.4 and 5.8%. Out of 100 parts of potash 74 to 98 were soluble in 4% hydrochloric acid and 52 to 71% in distilled water. Besides potash, "Kalikalk" contains about 37% of silicic acid, about 33% of lime, about 10% of clay, 8 to 10% of sulphuric acid (SO_3), 0.75 to 2% of magnesia, 1.75% of soda, 0.20 to 1.75% of oxide of iron. The fertilizing value of the three above mentioned samples of "Kalikalk," compared with that of sulphate of potash, was tested on oats grown in glass cylinders containing about 9 kg. of peat mould very poor in potash. As fundamental fertilizer 13.5 g. of carbonate of lime, 7.26 of basic slag, 4.5 g. of Chile saltpetre, 1 g. of sulphate of magnesium and 1 g. of chloride of sodium were placed in each cylinder. The amounts of "Kalikalk" added were 1.5 g. and 2 g. for each cylinder.

On the whole the tests have shown that the potash in "Kalikalk" has an excellent fertilizing effect, as was expected from the chemical analysis of this new fertilizer. "Kalikalk" had even a somewhat greater fertilizing value than sulphate of potash

and had a particularly good effect on the yield of grain. The respective fertilizing values of the three different samples tested were approximately equal.

Some of the Effects of the War Upon Fertilizers in the United States.—VAN SLYKE, L. L., in *New York Agr. Exp. Station Bulletin*, 471, p. 10. Geneva, N.Y., 1920.

A study of data regarding commercial fertilizers, collected during the years 1914 to 1919 inclusive, reveals facts showing some of the effects of the war upon commercial fertilizers.

Effect upon kinds.—The number of complete fertilizers decreased each year, going from 614 in 1914 to 171 in 1919. The mixtures of phosphoric acid and potash practically disappeared by 1916, while mixtures of nitrogen and phosphoric acid appeared in relatively large numbers in 1916 and the following years. Acid phosphate brands increased, while nitrate of soda decreased, and potash salts entirely disappeared. Bone, blood and tankage decreased.

Effect upon composition.—In complete fertilizers the average percentage of nitrogen decreased appreciably after 1915, while that of potash decreased greatly after 1914, and still more after 1916. The average percentage of available phosphoric acid increased considerably after 1914, but with some variation from year to year. The total percentage of available plant-food decreased continually after 1914.

Effect upon cost.—The average retail cost of one pound of plant-food increased year by year continuously after 1914 in the case of complete fertilizers, going from 8.8 cents per pound in 1914 to 33.1 cents in 1919, an increase of nearly fourfold. In the case of acid phosphate, nitrate of soda, bone, dried animal manures, etc., there was an increase in the retail cost of plant-food, but not relatively as great as in the case of complete mixed fertilizers.

The Use of Lime on the Soil.—FIPPIN, E. O., in *Cornell Reading Course for the Farm*, No. 148, pp. 31-92. 1920.

This is a popular bulletin based on New York conditions, the main purposes of which are to explain some of the reasons for the need of lime in soils; to point out the indications of that need and its distribution over the State; to explain the different forms of lime that may be used, and to point out their limitations and advantages; to give some directions for the use of lime; and finally to present briefly data showing the value of lime as a means of soil improvement as revealed in experiment station tests and in farm demonstrations.

Improvement of Lime Nitrogen.—BAUMANN, J., in *Chemiker Zeitung*, Vol. 44, No. 23, pp. 158-159. Kothén, Germany, 1920.

Some of the disadvantages of crude calcium cyanamid as a fertilizer are reviewed, and it is proposed to obtain the nitrogen of this fertilizer in a more suitable form by combining the cyanamid and ammonia-soda processes. The ammonia for the process is to be obtained from calcium cyanamid, and the liquors from the sodium bicarbonate, which contain ammonium chloride and sodium chloride, are to be evaporated to crystallize out the ammonium chloride. The ammonia is thus recovered as chloride for use as a fertilizer, and the lime which would have been used for regeneration of the ammonia is used for the manufacture of cyanamid. It is estimated that considerable saving can be effected by the proposed combination of the two processes. Alternate processes are also suggested.

Plant Analyses and the Fertilizer Requirements of Soil.—MUNTER, in *Journal für Landwirtschaft*, Vol. 67, No. 4, pp. 229-266. Berlin, 1919.

The results of fertilizer and rotation experiments begun in 1902 with beets, barley, potatoes, and wheat on a loess loam soil are reported.

Final results were obtained with wheat only. It was found that potash and phosphoric acid fertilization increased the silica content of wheat straw, and nitrogen fertilization reduced it. Potash and phosphoric acid fertilization reduced the nitrogen, lime, and magnesia contents of the straw, and nitrogen fertilization increased them. Potash slightly reduced the nitrogen content of the grain, and phosphoric acid strongly depressed it. A chemical analysis of the wheat plant from fertilized soil gave no sure indication of the fertility condition of the soil.

It was further found that in good cropping years nitrogen had the greatest influence on crop growth, and in poor years potash had the greatest influence. Phosphoric acid acted indifferently in this respect. Fertilization with an excess of nitrogen, potash, or phosphoric acid was mainly evident in the straw. The weather conditions of a year exercised a strong influence on the assimilation of nutrients by wheat, and the relative percentage of nutrient content was more strongly influenced in individual years by the weather than by fertilization.

It is believed that the nitrogen requirements of the soil used are indicated by the contents of nitrogen, lime, and magnesium in the wheat plant. When the sum of these three for 1 acre exceeds 80 lb. in the grain and straw, 55 lb. in the grain alone, or 25 lb. in the straw alone, there is sufficient nitrogen present in the soil. If, after

subtracting the sum of these three, the figures for the potash percentage are positive, there is sufficient soil potash, but if negative the soil is deficient in potash.

The wheat plants on plats receiving no fertilization and complete fertilization showed generally the same percentage content of nitrogen and phosphoric acid, while the potash content of the straw was higher on the completely fertilized plats. A comparison of analyses of plants from unfertilized and completely fertilized plats gave no indication of the fertilizer requirements of the soil.

It is concluded that the fertilizer requirements of a soil are best indicated when studied by growing and analyzing plants under two excess fertilizations, namely, nitrogen and phosphoric acid plus potash. If the nitrogen-potash ratio is narrower than 1:2 there is a potash deficiency. If the nitrogen-phosphoric acid ratio on the nitrogen plats is wider than 100:35 there is a phosphoric acid deficiency. If the ratio of nitrogen to phosphoric acid on the phosphoric acid potash plats is narrower than 100:60, or if the silica:nitrogen ratio is greater than 100:6 there is a nitrogen deficiency. If the percentage of nitrogen found in the wheat straw from the nitrogen plat is placed at 100 there is sufficient nitrogen present in the soil of the phosphoric acid potash plat provided the ratio of the two nitrogen percentages is narrower than 100:60.

Sulphur in Relation to Soil Fertility.—STEWART, R., in *Illinois Agr. Exper. Station, Bulletin* 227, pp. 99-108. Urbana, Ill., 1920.

The available data on the value of sulphur as a fertilizer are summarized, leading to the conclusion that there is no basis for the belief that it is necessary to add sulphur to soil in a permanent system of soil fertility.

Experiments extending over a period of years are reviewed, showing that under Illinois conditions sulphur is not a factor on brown silt loam soil in the production of such common farm crops as corn, oats, wheat, clover, and alfalfa. It is further shown that the sulphur supply of the soil is automatically replenished from the atmosphere, and it is concluded that the relation of sulphur to soil fertility is not in any sense similar to that of phosphorus, but is more similar to that of carbon on the basis that both sulphur and carbon are supplied to crops from the atmosphere.

Can the Farmer Mix His Own Fertilizers? TAYLOR, F. W., in *New Hampshire Agr. Exp. Station, Circular* 21, pp. 3-8. Durham, N.H., 1920.

Analyses of 21 samples of home-mixed fertilizers obtained from farmers in New Hampshire are reported and discussed.

It was found that the average of the nitrogen determinations of the 21 samples was within 0.06 per cent of the amount calculated. The average percentage of phosphoric acid was 2.34, and of potash 0.97 per cent higher than that calculated.

It is stated that variations almost as wide as these were found in 34 samples of complete factory-mixed fertilizers. The rather wide discrepancies in the phosphoric acid figures are attributed to the assumption that there was a smaller content of available phosphoric acid in the mixing ingredients than actually existed. It is considered true that the farmer can mix his own fertilizers fairly well.

The Partial Sterilization of Soils.—RUSSELL, E. J., in *Journal of the Royal Horticultural Society*, Vol. 45, No. 2-3, pp. 237-246. London, July, 1920.

Partial sterilization of the soil has been found to be an effective and in some cases the only means of eradicating organisms noxious to plants. Of the various methods tested, steam is decidedly the most efficacious and reliable, as it kills all organisms by bringing about a certain amount of decomposition. Owing to the expense involved with this method experiments have been carried out to find an efficient chemical sterilizer. The use of chemicals for this purpose is not only cheaper, but also more convenient. It is most essential that the substance should disappear from the soil after its work is done. This may occur by evaporation, oxidation or decomposition. The various substances tested include carbon bisulphide, toluene, cresylic acid (liquid carboic acid) and chloropicrin. The latter is one of the best, and proved fatal to eelworms and wireworms besides being harmless to plants, but it is unfortunately very awkward and dangerous to handle.

Toluene and carbon bisulphide are unreliable. Although liquid carboic acid was not nearly as effective as steam, it has proved the most convenient of all the chemical substances for use on a large scale.

In laboratory experiments its effectiveness against eelworms and fungi is improved by introducing chlorine atoms.

The method of using cresylic acid is to add 1 gal. of the acid to 40 gals. of water and apply the mixture to 9 to 19 sq. yds., followed by heavy watering. In the case of heavy soil the acid is applied in two doses at an interval of 14 days, the land having been previously dug over to a depth of 1 spit. Planting can begin at the end of one month. Good results can be obtained with half the dose.

Correlation Between Depth of Eyes and Degeneration Among Potatoes.—WHIPPLE, O. B., in *Proc. Amer. Soc. Hort. Science*, Vol. 16, pp. 181-183. College Park, Md., 1920.

After three years' work at the Montana Experiment Station with a deep-eyed potato variety in an endeavour to improve the commercial value by selecting to a shallower-eyed type, the yielding power was greatly reduced, and careful field counts showed 90 per cent of the plants to possess degenerate tendencies. Studies of hills and tuber characteristics in seed plants planted in 1919 on a tuber-unit plan and classified as normal-vigorous, intermediate, and degenerate, showed conclusively that shallowness of eye was correlated with degeneracy. In practically all varieties, the most perfect tubers as regards size, form, and depth of eye, came from intermediate plants, while in advanced degenerate types the depression about the eye was often entirely absent.

Hill Selection of Potatoes Where Rapid Degeneration is Prevalent.—WELLINGTON, R., in *Proc. Amer. Soc. Hort. Science*, Vol. 16, pp. 175-179. College Park, Md., 1919.

Hill selection experiments at the Minnesota Experiment Station, where potato varieties had been degenerating or "running out" very rapidly for many years, are described. It is stated that efforts made to select strains resistant to degeneration ended in total failure. High and low-yielding hills and tubers possessing so-called desirable and undesirable characters followed the same course, low-yielding hills often giving the better results.

Experiments on the Spacing of Potato Plants.—STEWART, F. C., in *New York Agricultural Experiment Station Bulletin* 474, pp. 32. Geneva, N.Y., 1920.

The principal object of the experiments here described was to determine the feasibility of employing close planting in the production of seed potatoes as a means of improving the quality of the crop through a reduction in the average size of the tubers.

The experiments were conducted at Geneva during five seasons and devoted, chiefly, to a comparison of 6 by 36 inch planting with 15 by 36 inch planting. The soil was a heavy clay loam of medium fertility. The variety Sir Walter Raleigh was used in 1914, 1915, 1917, and 1918, and Enormous No. 9 in 1919. Rows of thick and thin planting were alternated. At harvest time, the product of each row was sorted, according to weight, into four grades and the tubers of each grade weighed and counted. The grades were: (1) Under one ounce; (2)

from one to two ounces; (3) from two to twelve ounces; and (4) over twelve ounces.

In different seasons, the total number of tubers over one ounce in weight varied from 41,847 to 63,600 per acre for thin planting, and from 71,603 to 97,150 per acre for thick planting. The difference in favour of thick planting varied from 29,281 to 34,550 tubers per acre.

In total quantity of tubers over one ounce in weight, the yield varied, in different seasons, from 144.5 to 340.8 bushels per acre for thin planting and from 191.8 to 384.4 bushels per acre for thick planting. The difference in net yield (total yield minus seed) of tubers over one ounce in weight varied from 24.9 to 46.6 bushels per acre, and averaged 34.7 bushels per acre, in favour of thick planting. Over one-half of this difference (18.7 bushels), consisted of tubers over two ounces in weight.

The average weight of tubers over two ounces in weight was reduced from 10.5 to 22.8 per cent by thick planting. For table use, the size of the tubers of the crop from thick planting was superior to that from thin planting in 1914 and 1919, but in the other three seasons the tubers from thin planting were the better in this respect.

The results of the experiment appear to warrant the following conclusions: In the production of seed potatoes of varieties of the Rural group, New York growers may well consider planting considerably closer than 15 by 36 inches, since, thereby, the net yield is likely to be increased and the quality of the crop improved, particularly on rich soil. In the home seed-plot the spacing in the row should be as close as is consistent with roguing; but if the crop is to be sold the difficulty in disposing of the small tubers may necessitate somewhat thinner planting, except on rich soil. Potatoes grown in rich garden soil, for table use, may be planted as close as 6 by 30 inches with advantage.

Alsike Clover.—PIETERS, A. J., in *U.S. Department of Agriculture, Farmers' Bulletin* 1151, pp. 25. Washington, D.C., 1920

Alsike clover is most at home in northern latitudes or at high altitudes. It thrives best in a cool, moist climate.

In the Ohio Valley alsike clover is especially adapted to low, wet, fertile land. On such land it will yield heavy crops of first class hay and it will make more than one crop in a season.

This crop will grow on "sour" land on which red clover will not thrive. Where it is not possible to apply lime and so ensure a stand of red clover, alsike clover may be used. Mixed with red clover on uplands, alsike clover ensures a stand on spots where red clover does not catch.

Alsike clover is used mostly in mixtures with timothy or other grasses. In such mixtures it improves the hay and increases the yield. The grasses serve to support the clover and make it easier to cut and cure. Alsike clover will endure overflow that would kill most crops. It has been known to grow a year in water-soaked and water-covered soil and make a heavy growth. In the south it is recommended for creek bottoms and other wet lands.

It is a good pasture plant, often remaining in a permanent pasture for many years. It is a good clover to seed in swales or on wet, natural meadows. It volunteers readily and will spread in such places.

Its disadvantages are that—

On uplands alsike clover grows short and does not make a mass of growth equal to that of red clover. Alsike clover makes no second crop except on low, rich land. On uplands the pasturage after cutting for hay or a seed crop is too small to be useful. There appears to be some danger to horses and mules of a little-known disease said to result from eating alsike clover.

LIVE STOCK AND BREEDING

919.—Immunity in Epizootic Lymphangitis.—BOUQUET, A., and NEGRE, L. in *Comptes rendus de l'Académie des Sciences*, Vol. 168, No. 8, pp. 421-423. Paris, February 24, 1919.

Experiments on epizootic lymphangitis have shown the contrast between the extremely contagious nature of the disease, and the almost impossibility of reproducing it artificially. Most of the writers who state that they have obtained positive results were working in infected surroundings.

The writers have succeeded on several occasions in reproducing epizootic lymphangitis in the horse by means of inoculation with cultures of cryptococci and the total results obtained show that re-inoculation greatly increases the effect of the first inoculation. As regards the immunity obtained, the writers sum up their conclusions as follows:—

(1) The subcutaneous inoculation of a culture of cryptococcus gives rise to a nodule which forms an abscess, and heals without spreading; the extension and generalization of the initial lesion are produced by the re-inoculation of these cocci.

(2) In the case of an organism rendered susceptible by a first inoculation, the incubation period of the re-infection nodule is shorter than that of the primitive one.

(3) Animals suffering from natural, or artificially produced, lymphangitis become slowly immune; total immunity is not obtained until 50 days after the first inoculation.

922.—Cattle Scab Methods of Control and Eradication.—IMES, M., in *Farmers' Bulletin* 1017, U.S. Department of Agriculture, 29 pp. Washington, December, 1918.

A popular account of scabies in cattle. The writer dwells upon the following points—the nature and habits of the mites causing this disease; the symptoms produced by the different species: (*Psoroptes communis bovis*, *Sarcoptes scabiei bovis*, *Chorioptes bovis* and *Demodex folliculorum bovis*); ways of distinguishing the various types of cattle scab; control of the disease by dipping and spraying. He gives a series of very clear figures showing how a dipping-vat for infected cattle may be constructed. The dips most recommended are the lime-sulphur dips made in the proportion of 12 lb. of unslacked lime and 24 lb. flowers of sulphur per 100 gallons of water, and nicotine dips (using at least 0.05% of nicotine) either with or without 1.9% flowers of sulphur; during dipping the temperature should be maintained at from 95°F. to 100° F. in the case of the nicotine dip.

Crude petroleum dips are an effective remedy against scab, but the oil is apt to injure the cattle.

925.—Hemorrhagic Septicemia.—WASHBURN H. J., in U. S. Department of Agriculture, *Farmers' Bulletin* 1018, 8 pp. Washington, October, 1918.

A bulletin issued for the special purpose of telling how this disease can be recognized and prevented.

Hemorrhagic septicemia is a contagious disease caused by *Bacillus bipolaris septicus*; it is known as stockyard fever, when it attacks cattle; swine plague (contagious pneumonia), and is not easily distinguished from hog cholera; fowl cholera when it attacks fowls, pigeons, geese, etc. In swine and sheep, the malady often assumes an acute form (pneumo-enteritis) and death ensues in a few hours. No form of treatment has time to become effective. The injection of bacterins (bacterial vaccines) has proved useful in many instances in preventing the spread of an outbreak and protecting the unaffected portion of the flock, or herd.

933.—Important Poultry Diseases.—SALMON, D. E., in U.S. Department of Agriculture, *Bulletin* 957, 48 pp. Washington, March, 1918.

In this Bulletin, the causes, symptoms and treatment of each of the diseases are described. The following diseases are dealt with:—Contagious catarrh (croup) (pathogenetic agent unknown); fowl diphtheria (virus filterable and invisible); bird or chicken pox (virus filterable, same as that

of diphtheria); fowl cholera (*Bacterium avisepticum* and diseases of cholera-like nature (bacilli or *Bacillus coli* group); fowl typhoid (*Bact. sanguinarium*); white diarrhoea of chicks (caused by at least four different kinds of infection); *Bact. pullorum*, *Bact. avisepticum*, coccidia, *Aspergillus*; infection of *Bact. pullorum* confined to the ovary; *Coccidiosis*; brooder pneumonia or *Aspergillosis* (*Aspergillus fumigatus*); tuberculosis; entero-hepatitis (*Amoeba meleagridis*); gout (abnormal quantity of uric acid in the blood); gaps (*Syngamus trachealis*); intestinal worms (*Ascaridia perspicillum*, *Heterakis papillosa*, *Davainea echinobothridia*, etc.); favus, white comb (*Lophophyton gallinae*); lice; mites (*Dermanyssus gallinae*, etc.); depilating scabies; scaly leg; ticks (*Argas miniatus*, etc.); crop-bound or impacted crop; inflammation of stomach, or intestines; limberneck, paralysis of the neck muscles (a symptom of many diseases).

937.—Food Value of Couch-Grass: Research in Sweden.—WEIBULL, M., in *Landtmannen Tidskrift for Landtman*, Year 1, No. 17, p. 281. Stockholm, April, 1918.

The author had the opportunity of analyzing some samples of dried crushed couch-grass and obtained the following data (percentages):—Protein 8.3; fat 1.2; nitrogen-free extract 62; cellulose 16.5; ash 5; water 7. It is evident that, in a time of scarcity, couch-grass can be used as cattle food; its nutrient value is nearly the same as that of hay, from which, however, it differs by its smaller cellulose content, which is rather advantageous. The nutrient value of couch-grass has already been recognized in other countries; according to Pott, couch-grass is often used, in Normandy, in place of oats in horses' rations; animals eat it eagerly with good results. Although the protein and fat contents of couch-grass are smaller than those of oats, couch-grass contains the same glucoside as oats, that is to say coniferin, which in the animal organism serves in the synthesis of vanillin. The author adds that couch-grass is specially suitable for horses and sheep.

945.—A Comparison of Concentrates for Fattening Steers, in the United States.—WARD, N. F., JERDAN, S. S., and LLOYD, F. R., in *United States Department of Agriculture, Bulletin* No. 761, 16 pp. Washington, April 7, 1919.

I. The comparative value of cottonseed meal, cold-pressed cottonseed cake, and a mixture of cottonseed meal and maize for fattening steers. To make a comparison of the relative feeding value of cottonseed meal, cold-pressed cottonseed cake, and a

combination of cottonseed meal and corn-and-cob-meal, these three different concentrates were fed, with the same kinds of roughage, to 3 lots of 25 steers each, raised in Mississippi, aged 2 to 3 years and averaging 860 lb. in weight at the beginning of the experiment.

When on full feed each steer got:—

Lot I.—Cottonseed meal 7.4 lb. + corn silage 41.8 lb.

Lot II.—Cold-pressed cottonseed cake 11 lb. + corn silage 31.5 lb.

Lot III.—Cotton seed meal 6 lb. + corn-and-cob meal 3 lb. + corn silage 37 lb.

The steers of Lot II, which received cold-pressed cottonseed cake consumed much less silage than the others, because of the larger amount of dry matter in the concentrates of their ration.

The average daily gain in weight per head was 2.04, 2.01, and 2.05 lb. respectively for the 3 lots, or practically the same for all. The greatest variation in the total gain was 4 lb. per head during a period of 123 days.

The cost of the foods was as follows: cottonseed meal \$22.50 per ton, cold-pressed cottonseed cake \$16.50 per ton, corn 70 cents per bushel, cowpea hay \$10 per ton, silage \$3 per ton. The feed cost per pound of gain in live weight was respectively 7.0, 6.8, and 7.8 cents for the 3 lots and the net profit per head was \$5.45, \$5.50, and \$4.58, respectively.

Cottonseed meal at \$22.50 per ton, is as economical as cold-pressed cottonseed cake at \$16.50, for 3 lb. of the former were of equal feeding value as 4 lb. of the latter. The former contained 40.4% of protein and the latter 27.6% of protein; the cold pressed cotton cake was eaten readily from the first by all the steers.

There was no advantage in feeding a one third ration of corn-and-cob meal combined with cottonseed meal. The degree of finish for the 3 Lots was the same and all sold at the same price, viz., \$7.35 per hundred pounds.

The average dead-weight yield was 59.4%, 59.1%, and 58.8% respectively, which is high.

II. Comparison between the rations: (a) cottonseed meal; (b) one third cottonseed meal + two thirds broken-ear corn; (c) one third cottonseed meal + two thirds shelled corn; for fattening steers. Each of these three rations differing in concentrates was fed for 141 days to a lot of 25 two and three year old steers whose average initial weight was 825 lb. When on full feed they got the following daily rations:

Lot I. Cottonseed meal 7 lb. + corn silage 40 lb. + oat straw 5 lb.

Lot II.—Cottonseed meal 3.5 lb. + broken ear corn 8.7 lb. + corn silage 36 lb. + oat straw 2 lb.

Lot III.—Cottonseed meal 3.5 lb. + shelled corn 7 lb. + corn silage 38.5 lb. + oat straw 2.4 lb.

The steers of the 3 lots gained 1.56, 1.66 and 1.70 lb. per head per day on the average for the period of 141 days. The final average weights were 1,044, 1,059 and 1,066 lb. respectively.

The feed cost per pound of gain was respectively 9.53, 10.82 and 10.75 cents. Lots II and III were accompanied by a herd of 25 hogs to consume the incompletely digested corn in the dung. The net average profit per head was \$15.19 for Lot I, \$11.87 for Lot II, and \$11.48 for Lot III, if no credit is given for the gain in weight of the hogs, which was about \$3 per steer.

Without hogs following the steers the feeding of corn would have been considerably less profitable than feeding with cottonseed meal alone; but as carried out the use of corn gave approximately the same profit. The dressed yields of each lot were 58.2%, 57.8% and 57.4% respectively; the carcasses were well covered with fat. The steers sold for \$8.60 per 100 lb. live weight, except one steer of Lot I, which sold for \$8 per 100 lb. In this experiment it is assumed that the cost of labour was covered by the value of the manure.

948.—Correlation Between the Percentage of Fat in Cows' Milk and the Yield.—ROBERTS, C., in *Journal of Agricultural Research*, Vol. XIV, No. 2, pp. 67-96. Washington, July 8, 1919.

It is a generally accepted opinion that cows with a large yield of milk produce a smaller percentage of fat than do cows with a small yield of milk. To what extent this is true, has, however, up to the present time never been demonstrated by careful scientific investigation. From the study of the records of 2,166 Ayrshire cows, James Wilson (The Separate Inheritance of Quantity and Quality in Cows Milk, in *Scientific Proceedings of the Royal Dublin Society*, New Series, Vol. XII, No. 33, pp. 470-479, 1910) concluded that yield of milk and percentage of fat were inherited independently of each other.

In a criticism of this work (Note on the Separate Inheritance of Quantity and Quality of Cows' Milk, *Biometrika*, Vol. VII, No. 4, pp. 548-550, 1910) K. Pearson, by means of a correlation table, showed that with an increase in the yield of milk, there was a small but significant decrease in the percentage of fat.

In a later work (The Principles of Stock Breeding, pp. 121-122, London, 1912), J. Wilson states that high quality of milk,

that is to say milk rich in fat, is produced by cows giving all kinds of yields high, average, or low, and the same may be said as regards milk of low quality. These facts would appear to prove that yield and quality are independent characters. It seems to the writer, however, that it would be well to make a more careful statistical investigation of the matter.

A large body of data forming the greater part of the material for this investigation was furnished by the registers of the different American Associations for breeding milch cows. Only yearly tests were used. The method of finding the relation between the percentage of fat and the yield of milk was by means of the correlation table. The cows were divided according to their ages at the beginning of the experiment into the following 4 groups:—2 to 3 years; 3 to 4 years; 4 to 5 years; 5 years and over.

The writer concludes from the results of his investigations, that a significant negative correlation exists between the percentage of fat in cows' milk and the yield for Jerseys, Guernseys, Holstein-Friesians, grade Jerseys, grade Holstein-Friesians, and cows unclassified as to breed. The correlation for Ayrshires is not significant in the subgroups classed in respect to age, but it is significant when these groups are treated as a whole.

The yield of milk increases with age. However, since all cows 5 years of age and over are classed together, it may well be that the yield decreases at some period beyond 5 years. Pearl and Patterson (*The Change of Milk Flow with Age from the Seven-Day Records of Jersey Cows, Maine Agr. Exp. Sta. Bull. 262*, pp. 145-152, 1917) showed that in Jersey Cows, when the 7-day records were used, the maximum production is reached between the eighth and the ninth year.

C. Crowther (Variation in the Composition of Cows' Milk, *Journal of Agricultural Science*, Vol. I, part 2, pp. 149-175, 1905), from his records of Ayrshires, is of the opinion that maximum production is close to the eighth year. In the Jerseys, Guernseys, and Holstein-Friesians the percentage of fat remains fairly constant for the different ages studied. However, the group of animals 5 years of age and over in the Jerseys and Guernseys shows a slightly lower percentage of fat than the younger groups. In the case of the Ayrshires, there is a gradual decrease with age. Between the youngest and the oldest groups there is a difference of 0.15%. When judged by the standard deviation, age has no influence in the variability of the percentage of butter fat. But the class 5 years of age and over is more variable in the yield of milk than the younger groups.

This may be due to the inclusion in this group of old cows whose milk has decreased.

Using the standard of deviation as a basis of comparison, it is found that the breed has an influence on the variability of milk yield and percentage of fat. For variability in yield the breeds stand in the following order in an ascending scale:—Jersey, Ayrshire, and Guernsey practically the same, then Holstein-Friesian. For percentage of fat, the order is: Holstein-Friesian and Ayrshire about the same, Guernsey, Jersey.

The average production of milk is as follows:—Holstein-Friesian 14,443.1 lb.—Ayrshire 9,417.1 lb.—Guernsey 8,644.4 lb.—Jersey 7,491.4 lb. The average percentages of fat for the different breeds are:

Jersey 5.392 lb.—Guernsey 5.033 lb.—Ayrshire 3.933 lb.—Holstein-Friesian 3.435 lb.

952.—The Open Shed Compared with the Closed Barn for Dairy Cows.—WOODWARD, T. E., TURNER, W. F., HALE, W. R., and McNULTY, J. B., in U.S. Department of Agriculture, *Bulletin No. 736*, 13 pp., Washington, D.C., November 15, 1918.

Twenty-one cows were used in the experiment herd, being divided into two groups, which were kept alternatively in the open shed and the closed barn for three years.

-In general, little difference could be noted in the contentment of the cows under either open-shed or closed-barn conditions. There seems to be little, if any, difference in the amount of actual sickness observed under the two conditions. But the closed barn was a modern, well ventilated structure, and in many of the common poorly ventilated dairy barns the impure air would doubtless be an important factor in determining the comparative merits of the system. The period of housing cows is placed at an average minimum of five months, from November to March, for most sections of the United States.

The results of the experiments are summarized as follows:

The cows consumed somewhat more feed and produced slightly more milk when kept in the open shed than when kept in the closed barn. The increase in production was not large enough to offset the extra feed cost.

When kept in the open shed there was a tendency for "boss cows" to deprive weaker individuals of their feed and of the normal advantages of the shed, which resulted in lower milk yields from the weaker and more timid cows.

All operations considered, milking and feeding excluded, slightly more labour was required to care for the cows when kept in the open shed. The manure was apparently well preserved, until it could be hauled to the

land, under the open-shed system. It was also handled more economically than in the closed barn. Cornstalks in the manure were sufficiently decomposed to be handled successfully with the manure spreader.

Under the open-shed system, 68 per cent more bedding was required for each cow, but the cows were cleaner and more comfortable. There was little difference in the time required to bed them under the two systems. It is possible to use cornstalks or other coarse material for bedding in the open shed.

There appeared to be little if any difference in the frequency of injuries to cows under open-shed or closed-barn conditions.

959.—On the Possibility for Breeders to Obtain Cocks or Hens According to Their Wishes.—LIENHART, in *Comptes rendus de l'Academie des sciences*, Vol. 169, No. 2, pp. 102-104. Paris, July 15, 1919.

The author's procedure consists in knowing how to recognize sex in the egg before incubation has commenced.

In all kinds of fowls, the cock is always larger and heavier than the hen of equal age. The difference in the weights of the respective sexes varies, according to the breed, between 0.5 kg. and 1 kg. or sometimes even more. The author has remarked that the difference of weight, in a less degree, is noticeable in chickens; it even appears in the very young chicks (differences of 18 to 27 gm. for chicks of 5 days old). It was, therefore, natural to think that this difference in weight would also be found in the egg, but it was necessary to furnish experimental proof.

A first attempt gave no results, having been made with eggs of mixed breed hens. In fact, in a mixed breed all the hens, even if they belong to the same brood, do not lay eggs of similar weight. They group themselves, in this respect, according to their respective origins, and in the same hen-house where all the layers are similar, that is to say all of equally mixed breed, distinct families exist, from the point of view of the average weight of the egg, regular lines which can be separated by selection, some laying small eggs, others eggs of medium weight and others again that lay large eggs. Consequently, in choosing for experiment the larger eggs out of a lot laid by mixed bred hens one simply eliminates all the eggs of maximum weights laid by the lines giving small eggs and takes only those of lines giving large eggs, and selection of eggs is illusory. It is therefore indispensable to carry out the experiment with eggs laid by a pure bred race. This is what the author did in the spring of 1918, working with Leghorns. In that breed, the average weight of the cocks is 3 kg., and of hens is

1.90 kg.; the average weight of eggs is 62 gm.; the difference between extremes is 16 gm., the smallest eggs weighing 54 gm. and the largest 70 gm.; few eggs weigh less than 58 gm. or more than 66 gm. Sixty eggs, laid by hens all belonging to one brood and chosen out of the largest of a lot of 350, were placed in the incubator (these eggs weighed between 59 and 70 gm. each.) On hatching, they gave 48 chicks of which 37 were cocks and 11 hens, a proportion of 77 per cent of cocks. This result is convincing. It can, therefore, be affirmed that for a given breed and a homogeneous brood the heavier eggs ought to produce cocks and the lighter eggs hens.

The author has tried still further to improve his method. As all young hens of 1 year old lay eggs noticeably smaller and lighter than the normal average, and as, on the other hand, in the course of the year, the eggs of the same layer, even if she is full-grown, are noticeably smaller at the beginning and at the end of the laying season than in the middle, it is indispensable that all the laying hens should be of equal age and that the eggs should be collected when the laying is at its maximum. It would be well to set all the eggs of the selected lot separating the heavier from the lighter.

By marking on each egg set to incubate its exact weight, by breaking it when it is about to hatch and by making a post mortem examination of the chick to find out the sex, it should be possible to find, with regard to the initial weight of the egg, the sex which it contained and thus know the weight at which the determination of sex by weighing becomes doubtful, for a given breed.

960.—Correlation Between Egg Production During Various Periods of the Year in the Domestic Fowl.—HARRIS, J. A., and BLAKESLEE, A. F., in *Genetics*, Vol. 3, No. 1, pp. 27-72, bibliography of 6 works. Princeton, N.J., Jan., 1918.

Results of a biometric study of the relationships between egg laying during different periods of the year in White Leghorn hens. The constants are based on two international egg-laying competitions held at Storrs, Connecticut. The constants for each of the two years are in very close agreement with each other.

There is a significant positive correlation between the number of eggs laid by a hen in any month of the year and the number of eggs laid in the whole year. The correlation coefficient r varied between 0.38 and 0.69 in 1913-1914, and between 0.37 and 0.70 in 1914-1915; during these two years the average was 0.550 and 0.562 respectively.

The correlation between the record of one month and the egg production of the year, serving as a basis for formulae by which

the production for the whole year may be predicted, has great practical importance. As a biological constant it has the disadvantage that it is, to a certain extent, spurious, due to the fact that the monthly egg-laying figures are included in the annual total which is correlated with each month's production. That is the reason why the authors have studied the correlations between each month's record and the production of the other 11 months of the year.

These correlations, like those between the monthly and annual egg production, are positive and are significant from a statistical point of view; they varied between 0.30 and 0.57 in 1913-1914 and between 0.24 and 0.57 in 1914-1915. The constants are on the average 21% less than those expressing the correlation between the monthly and the annual production.

The high egg production of a hen does not, therefore, generally depend much on a high production in a given month, but on a permanent differentiation (at least during the first year of laying) in the egg-laying capacity of the hen. This conclusion is fully confirmed by the correlations between the monthly records. These are always positive, but not uniform in magnitude. Two laws governing the intensities of these relationships are discernible, although they tend mutually to obscure each other:—(1) the correlation between the monthly egg production tends to become smaller as the two months considered are more widely separated; (2) the correlation between the egg production of the autumn and winter months, at the beginning and end of the year of the competition, is closer than that between the egg production of the spring and summer months.

The relative influence of the various months of the year on the variations in the annual production differs greatly. The authors have shown that, during the winter months (November, December, January and February), and the following autumn months (August, September and October), the egg production is greater than the theoretical production when the total annual production exceeds the normal. The spring and summer months, from March to July, contribute relatively less to the excess of the total above the normal egg production.

From a practical point of view, the result of greatest importance is the demonstration of the fact that trap-nesting and record throughout the year are not necessary for obtaining conclusions of great value. The record of one month suffices for dividing the hens into groups differing widely in annual egg production. It would, therefore, be possible, at the commencement of the

laying season, after one month to divide the flock approximately into two halves, one of which will lay on the average, 136 to 139 eggs a year and the other from 167 to 170; or, if it is thought desirable to retain only a quarter of the flock for laying, a production of from 176 to 187 eggs annually per hen may be secured. The selection of hens for breeding purposes in September or October would be made among the quarter containing the best laying hens of the flock whose annual average egg production would be about 190 eggs per hen.

FARM ENGINEERING

968.—*The Garner Tractor.*—*The Implement and Machinery Review*, Vol. 45, No. 530, pp. 234. London, June 1, 1919.

The "Garner" tractor derives its title from the fact that it is placed upon the market by Messrs. Henry Garner, Ltd., Mosely Motor Works, Birmingham. It is of the four-wheel type, the two front wheels steering. The engine, flywheel housing, three-speed gear box and rear axle are all firmly bolted together.

A small frame, fitted to the engine bearers, and carried around the front, forms a central pivot for the front axle and transverse spring. The four-cylinder engine, cast in one piece, has a 4½ inch bore, with a stroke of 5½ inches. It develops 28.9 h.p., and the governed speed can be varied from 900 to 1,200 revolutions per minute. The carbureter is designed to start on petrol, and run on paraffin, and the ignition is by high tension magneto. A radiator of large capacity secures efficient cooling under all working conditions. The clutch is operated by a foot pedal, and though totally enclosed, is accessible by means of the large inspection cover provided. The clutch takes up the load gradually. Three speeds—of 1½, 2¾ and 5 miles per hour—and a reverse are provided. The rear wheels, which have a diameter of 40 in. and a width of 10 in., are fitted with easily detachable spuds; whilst the front wheels are of 30-in. diameter. Internal expanding brakes act directly on the rear wheels, and are operated by foot pedals; whilst a front transverse spring enables the machine to be used on the roads and also acts as a shock absorber. A pulley is mounted on the gear-box for stationary work, for driving threshing machinery etc.

The total weight of the tractor is 34 cwt. Its maximum height is 5 ft. 1 in., and its overall length 10 ft. 6 in. The "Garner" can operate a three or four-furrow plough on ordinary land and a two or three-furrow implement on stiff land.

RURAL ECONOMICS

The Cost of Producing Wheat in Kansas, Crop of 1919.—MOHLER, J. C., in *Kansas Bd. Agr. Quarterly Report*, Vol. 38, No. 151, pp. 31. Topeka, Kansas, 1919.

This is a summary of statements from 2,057 Kansas wheat growers, collected by the State Board of Agriculture in December, 1919, by means of a questionnaire carrying 245 questions on the cost of producing wheat. These growers represent every county in the State and both landowners and tenants.

The cost per acre is stated to have been less affected by the yield than the cost per bushel. For the State as a whole a loss of 43 cents an acre is shown for the crop of 1919, but in the main wheat belt (central Kansas) the loss reached \$1.52 an acre. Of the total wheat acreage in the State 76 per cent showed a loss and 24 per cent a gain. It is said, however, that these amounts do not show the full extent of the loss because in the calculations nothing was charged for the loss of fertility by the soil, the lack of compensation for overtime work, and the lack of proper employment for a portion of the year.

Tabulations are given, showing the number of acres, production, and value of winter and spring wheat for the year 1919, and detailed statements of the cost of producing an acre of wheat are included for the entire State, the eastern, central and western divisions, and the northern and southern sections of each of the latter.

AGRICULTURAL INDUSTRIES

1004.—Cooling of Milk and Cream.—GAMBLE, J. A., in *U.S. Department of Agriculture, Farmers' Bulletin* 978, 16 pp., Washington, 1918.

The author deals with the following points in a general statement of practical use in dairies, including the principles and technique of the refrigeration of milk and cream:—The necessity of rapid cooling—Development of micro-organisms in the milk—Principles of refrigeration—Use of refrigerants which operate on the surface of the cans—Cooling tanks for the milk—Use of water from wells or a spring for cooling the milk—Refrigeration of the milk during transport—How to stop adulteration of milk—Cream refrigeration.

1009.—Whale Meat.—*The Pastoral Review*, Vol. XXIX, No. 5, pp. 455. Melbourne, May 16, 1919.

Whale meat is coming into general use throughout North America, as it already is

in Japan. There are on the Pacific coast of America seven whaling stations in active operation, belonging mostly to United States and Canadian concerns. The Norwegians own a plant at Akutan, Aleutian Islands. There are two stations on Vancouver island, two on Queen Charlotte island, one at Bay city, Washington, one at Port Armstrong, and another on the Alaskan coast. Two of these have ample cold storage plants and the others have been developing them as the meat industry enlarged. The same two have big canning equipments, which the others are in process of duplicating. The nearest supply station at Bay city, Washington, put over 300 tons of whale meat on the American and foreign markets last season, including the canned output. These seven stations have reported the capture of 659 whales in 1917, and were expected at the close of 1918 to have reached the 1,000 whale mark. Whale meat in its preparation is treated, like other fresh foods, that is, after butchering, it is placed in ice in ship holds, taken to railway ports, and forwarded over the country in refrigerator cars.

The meat extends in great masses from the base of the skull to the tail fin and downwards to the middle line. This meat, all of it of the same quality, amounts, roughly, to 10 tons for each 50 ft. in length of the mammal. Seeing that a whale will go up to 75 ft. in length, there may be 15 tons of solid meat available on one carcass. Even a 50-ft. whale will produce as much flesh as 100 average steers or 500 sheep.

Whale meat has a similar appearance to that of beef. It is a little coarser in texture, and has a slight flavour of venison. It is usually served in the form of roasts and steaks in America, and it is said that when on the table it is very difficult to distinguish from beef. One of the best eating parts is the heart, which weighs a matter of one and a half tons. The tongue will go up to 3,000 lbs., but it is much tougher than ox tongue, and is not looked on as such a delicacy. Whale flesh has a great advantage over that of sheep, cattle, or pigs in that it is diseaseless. At all events, it is said to be. Then, again, the meat is in a solid lump of uniform quality and without bone. Whether it can be put on the market cheaply enough, and in sufficient quantities to compete successfully with beef, remains to be proved. There is nothing to indicate that the supply is inexhaustible. If the meat is too cheap there may be a danger of the mammal becoming exterminated in a short period. It will be remembered that it did not take long to exterminate the American bison.

1011.—Acidity of Silage Made from Forage Crops.—NEIDIG, R., in *Journal of Agricultural Research*, Vol. XIV, No. 10, pp. 395-409. Bibliography of 16 works. Washington, Sept. 2, 1918.

It has been found (Dox, Neidig) that the quality of maize silage depends chiefly on the nature of the acids which are formed during fermentation. The author attempted to ascertain whether the same acids are developed when other commonly grown crops are used for silage purposes. He shows in a series of tables, the results of the determinations of acetic, propionic, butyric and lactic acids, as well as the total acidity produced amongst different plants or plant mixtures used as silage, which have been employed in these researches.

The survey of foregoing work and the results obtained by the author show that all the specimens of high-class maize silage which were examined contained lactic, acetic and propionic acids. The non-volatile lactic acid usually occurs in excess of the sum total of volatile acetic and propionic acids. Amongst the volatile acids, the acetic is much in excess of the propionic acid. The plants or mixed silage plants under examination which showed an acid fermentation similar to maize silage, and which furnished excellent forage were as follows:—Oats + peas (in any proportion) oat; peas; wheat + peas; clover; clover + wheat straw.

On the other hand, alfalfa and a mixture of alfalfa and wheat straw did not develop an acid fermentation similar to that of maize silage, and did not show any fitness for use as silage.

Butyric acid was always found in spoiled or partly spoiled sample.

In a sample of forage silage composed of alfalfa alone, and collected 9 months after siloing, butyric acid was noticeable, and the alfalfa could not be used as forage.

1013.—New Method of Packing Preserved Vegetables.—ANSEMBERGER, G., in *L'Industrie Francaise de la Conserve*, Year V, No. 28, pp. 121-125. Paris, June, 1919.

The methods generally adopted for preserving vegetables have many disadvantages which have the result that the taste and nutritive value of the manufactured products are diminished. The preliminary operation, known as "blanching" which consists in plunging the vegetables into boiling water for a fairly considerable time, is one of the principal causes of waste. This water is considered as waste when the operation is ended. Analysis has shown that it contains carbohydrates and salts

removed from the vegetables; the value of the latter has therefore deteriorated. When they are later put into metallic boxes, in order to be sterilized, the vegetables are again covered with a certain amount of water; it is in fact necessary that they should be submitted to the direct action of the water vapour under pressure, to guarantee long preservation. At the end of the cooking process, and there is still sufficient water for the washing of the edible portions, by virtue of the laws of osmosis, they give up to the liquid into which they are plunged, part of their soluble constituents, until equal concentration of the two liquids is reached; that which forms a component part of the vegetable cells, and which surrounds them. Now the liquid contained in the open box is usually thrown away by the consumer, who really uses a food of reduced value.

The new methods destined to cope with the disadvantages mentioned are steam "blanching" and the Huch process.

In steam "blanching" water is substituted by steam under pressure, and the vegetables are put in an airtight chamber. With steam the vegetables are not immersed in a large quantity of boiling water, and, besides this, it is a much quicker operation than the old system. If the steam contains some of the alimentary principles of the vegetables, it is in relatively small proportions, and the lowering of the nutritive value is much less than before.

The Huch process reduces to a minimum the loss of the nutritive elements due to osmosis of the vegetables placed in metallic boxes; it consists in the least possible use of the liquid, which could not be completely suppressed; it is necessary to have enough water so that the vegetables, during the heating process, respond to the sterilizing action of steam under suitable pressure and retain afterwards sufficient moisture. But to avoid keeping the vegetables in the liquid until the moment for their use, which is not absolutely necessary, the following device should be used: a box is taken with a double bottom, the upper one perforated like a skimmer and placed at 5 mm. distance from the real bottom. The space enclosed between the two is filled with water and all the upper layer receives the vegetables previously treated with steam. The box is heated in a vertical position, the water vaporizes, and the steam comes in contact with the vegetables; the steam condenses in cooling, and the water as a consequence takes its former place between the two layers; the vegetables are thus no longer bathed in the liquid and on the other hand, the presence of a small quantity of water at the bottom of the box retains the required moisture.

From control experiments, on the appearance, taste and chemical composition of produce preserved by means of the usual process and by the Huch process, the advantages of the latter can be clearly seen.

1015.—Preservation of Eggs by Refrigeration after Preliminary Sterilization.—*Revue Scientifique*, Year LVII, No. 8, p. 242. Paris, April, 1919.

The methods of preserving eggs in use until these last few years, and consisting either in plunging the eggs into lime water or into a solution of an alkaline silicate, or coating them with fats, such as vaseline, lard or paraffin, are very unsatisfactory methods. The eggs thus treated are often of a bad taste, and are not protected from putrefaction, because they have not been sterilized.

The cold storage method itself, although used on a large scale (in America, for example, for over two milliards of eggs each year) is not sufficient to ensure perfect preservation. The cold, in fact, does not kill the ferment-causing germs which have penetrated through the shell before the operation; it only suspends their development, which starts again immediately the temperature rises to 1°C. In this way the waste frequently exceeds 5%.

To preserve the egg fresh and wholesome with all its qualities, Lescards discovered that it is sufficient to combine refrigeration with preliminary sterilization in a closed vessel. The eggs are first tested by holding them to the light to eliminate those which are old or cracked; then they are shut in an autoclave attached to a vacuum pump; this operation has the effect of drawing out the gases contained in the little air space in the egg, and thus dissolved in the albumin. Following this, carbonic gas and nitrogen an antiseptic mixture with which the eggs are thus saturated, is introduced into the autoclave. The eggs, now being sterilized, are carried to cold rooms where the temperature is kept between 0° and 2°C. They can remain preserved thus a very long time; at the end of 10 months, the albumin has still retained its whiteness, the air space has remained very small, and the sterilized egg and a fresh egg differ neither in appearance nor taste. The method is already applied in several factories especially equipped for the purpose in France, Belgium and the United States.

PLANT DISEASES

A Helminthosporium Disease of Wheat and Rye.—STAKMAN, LOUISE J., in *University of Minnesota Agr. Exp. Station Bulletin* 191, p. 23.

For several years a destructive disease of wheat, caused by *Helminthosporium*, has been under observation in Minnesota. In the spring and early summer of 1919, serious attacks of seeding blight occurred in practically all wheat growing regions of the state. Marquis was one of the varieties most seriously infected. The cause of this blight has been shown to be a species of *Helminthosporium* which also attacks practically all plant parts. On older plants it is often found associated with *Septoria* and *Fusarium*. All three may occur on one head or one node. All parts of the plant may be affected by *Helminthosporium*, although there is no evidence that the disease is systemic. Since the foot and root may become seriously and permanently diseased, there is a possibility of new infection from stubble. This fact has an important bearing upon the subject of continuous cropping. A similar disease has been found on rye.

The disease clearly is seed-borne. Seeding blight almost always results from sowing diseased seed, although the causal fungus apparently is less virulent than the wheat scab organism. Many infected seedlings revive. Some are left in a weakened condition and with infection at the base. Secondary infections occur on leaf, culm, and head. The problem is at least partially one of clean seed wheat, but probably also of systems of cropping. While the *Helminthosporium* foot rot resembles somewhat the take-all as it develops in Illinois, there are certain differences and it can not be stated that the two diseases are identical. With our present knowledge it seems unsafe to call the disease as it has developed in Minnesota "take-all" or even to assume that is identical with the foot rots described from other parts of the country.

The partial or almost complete recovery of many of the severely injured seedlings suggests that the disease need not cause undue apprehension on the part of wheat growers. Apparently the disease develops most abundantly when plants are weakened by unfavourable weather conditions. It is quite probable that losses can be minimized somewhat by good cropping methods. However, the disease certainly is capable of doing appreciable damage, and whatever control means suggest themselves as the result of the work done up to the present time should be applied in order that the disease may be kept in check.

AGRICULTURAL STATISTICS

WORLD'S PRODUCTION OF WHEAT

Countries.	1920.	1919.	Five years' pre-war average 1909-13.
	Bush.	Bush.	Bush.
NORTH AMERICA—			
Canada.....	263,189,000	193,260,000	197,118,000
United States.....	789,878,000	934,265,000	686,697,000
Mexico.....	10,000,000 (a)	10,000,000	8,000,000
Guatemala.....	312,000	251,000	632,000
Total, North America.....	1,063,379,000	1,137,776,000	892,447,000
SOUTH AMERICA—			
Argentina.....	223,000,000	214,142,000	148,908,000
Chili.....	14,000,000 (a)	12,000,000	14,000,000
Uruguay.....	6,000,000 (a)	5,416,000	6,519,000
Total, South America.....	243,000,000	231,558,000	169,427,000
AUSTRALASIA—			
Australia.....	140,000,000 (b)	44,001,000	90,500,000
New Zealand.....	7,000,000 (a)	4,005,000	7,070,000
Total, Australasia.....	147,000,000	48,006,000	97,570,000
AFRICA—			
Algeria.....	8,929,000	19,166,000	34,998,000
Egypt.....	31,711,000	30,137,000	34,121,000
Tunis.....	3,987,000	5,841,000	6,230,000
South Africa.....	8,650,000	6,630,000	6,520,000
Total, Africa.....	53,277,000	61,774,000	81,869,000
ASIA—			
India.....	376,768,000	280,299,000	359,035,000
Japan.....	29,468,000	30,676,000	24,166,000
Korea.....	7,000,000	7,144,000	5,922,000
Persia.....	13,000,000 (a)	13,000,000	13,600,000
Total, Asia.....	426,236,000	331,119,000	402,723,000
EUROPE—			
Great Britain and Ireland.....	57,000,000 (c)	69,324,000	59,640,000
France.....	230,406,000	182,446,000	317,639,000
Italy.....	141,096,000	169,771,000	183,336,000
Belgium.....	7,949,000	9,895,000	14,894,000
Netherlands.....	6,677,000	6,015,000	4,896,000
Denmark.....	6,000,000 (a)	5,923,000	5,344,000
Norway.....	1,000,000 (a)	1,071,000	306,000
Sweden.....	11,123,000	9,509,000	8,103,000
Switzerland.....	3,586,000	3,524,000	3,314,000
Spain.....	134,457,000	129,251,000	130,447,000
Portugal.....	5,000,000 (a)	6,400,000 (a)	7,440,000
Greece.....	13,288,000	9,693,000	9,400,000 (d)
Bulgaria.....	41,190,000	34,029,000	29,308,000 (d)
Jugo-Slavia.....	48,900,000	50,956,000	57,896,000 (d)
Roumania.....	24,000,000	48,492,000	18,569,000 (d)
Bessarabia.....	17,815,000	16,988,000	23,541,000 (e)
Czecho-Slovakia.....	24,436,000	15,051,000	113,100,000 (d)
Germany.....	78,925,000	79,700,000	79,700,000
Total Europe (less Jugo-Slavia).....	803,948,000	797,082,000	987,173,000
World's total.....	2,736,840,000	2,607,315,000	2,631,209,000

(a) Estimates based on condition reports.

(b) Broomhall.

(c) Official for England and Wales, and Ireland; estimated for Scotland.

(d) Average 1914-18.

(e) Year 1914.

The figures in the above table are practically all official, and constitute a satisfactory statement of the world's production of wheat in 1920, compared with that of 1919 and the pre-war five-year average. All the

producing countries of any importance, except Russia, are included, and Russia is so much out of the world's trade that it need not be considered.

Taken as a whole, the harvest of 1920 was above the average, and greater than that of last year. The world's total shows an increase of 130,000,000 bushels over last year, and 106,000,000 over the pre-war average.

The five great wheat exporting countries: Canada, United States, India, Argentina and Australia, produced this year 1,793,000,000 bushels, an increase of 130,000,000 over last year, and 310,000,000 above the average.

Europe produced 7,000,000 bushels more than last year, due chiefly to the improved crop in France, but the European total is still 183,000,000 bushels less than the pre-war average.

Summing up, the production of the importing countries shows a considerable improvement over last year, though still under average, while the exporting countries produced excellent crops, more than sufficient to supply all requirements.

THE WORLD'S WHEAT SITUATION

Sir James Wilson, K.C.S.I., in a recent article, deals very fully with the wheat supplies of the world, as shown by the official statistics published by the International Institute of Agriculture. The following are the conclusions he arrives at regarding the world's wheat supply and needs. The figures, which represented quintals in the original article, have been converted to bushels in the Institute Branch.

Excluding Russia and Roumania (which on the pre-war average exported annually 217,000,000 bushels, or nearly one-third of the world's net exports) and India (export from which country was then practically prohibited), the other exporting countries began the cereal year on the 1st of August, 1919, with about 224,000,000 bushels of exportable surplus still in hand, besides which there was the unusually large quantity of 70,000,000 bushels afloat on its way from the exporting to the importing countries. During the cereal year ending with July, 1920, the exporting countries exported 690,000,000 bushels compared with 665,000,000, the pre-war average net export of all exporting countries, including Russia, and ended the year on 31st July, 1920, with only about 100,000,000 bushels of exportable surplus, besides which there were 77,000,000 bushels afloat. Of the importing countries, Britain, France and Italy (which on the pre-war average imported 312,000,000 bushels), imported in 1919-20 no less than 382,000,000 bushels, and other European countries imported (including relief supplies) about 195,000,000 bushels as compared with 231,000,000 before the war. All the importing countries taken together imported 670,000,000 bushels, or about the same quantity as their pre-war average imports, and the most important of them ended the cereal year on 1st August, 1920, with about their normal carry-over. During that year the Argentine and Australia got rid of the greater part of their embarrassing surpluses, which had accumulated mainly owing to

lack of tonnage; indeed, the Argentine oversold and had to prohibit further export in order to retain enough wheat for home consumption. Towards the end of the cereal year the United States had a practical monopoly of export, and took advantage of the situation to obtain very high prices for large exports.

After 1st August, 1920, Britain reaped a poor crop, only about equal to the pre-war average. The measures taken to reduce the bread subsidy raised the price of the 4 lb. loaf from 9½d. to 1s. 4 d., which must have some effect in reducing consumption; and the import of wheat during the current cereal year ending with July, 1921, seems likely to be about the pre-war average, say 220,000,000 bushels, as compared with 212,000,000 last year. France has reaped a much better harvest than in the previous year, and both Government and people are making strenuous efforts to reduce consumption; she may be content with 18,000,000 bushels of import as compared with 88,000,000 last year. Italy has had a very poor crop, and although the Government have taken measures to reduce consumption, she may have to import about 90,000,000 bushels, compared with 85,000,000 bushels last year. The other European countries have on the whole had better crops than last year, and as the cost of foreign wheat measured in their depreciated paper currencies is still very high, they may content themselves with an import of 202,000,000 bushels, as compared with 195,000,000 last year. Allowing for countries outside Europe 90,000,000 bushels, or the same as last year, the import during the current cereal year of all the importing countries in the world may be roughly estimated at 625,000,000 bushels, as compared with 670,000,000 last year.

Turning to the exporting countries. The United States, though it has had a smaller yield than last year, has (including 30,000,000 bus. of old wheat) an exportable surplus of 195,000,000 bus. Canada has had an exceptionally good crop, and can spare a

similar quantity. The Argentine and Australia are now reaping good harvests, and can probably spare 130,000,000 and 110,000,000 bus. Bulgaria can spare 11,000,000 bus., and the Government of India are allowing the export of at least 15,000,000 bus. out of India's large surplus from the excellent harvest reaped last May. These make a total of 655,000,000 bus., and as the quantity afloat on 1st August, 1920, exceeded the normal by 40,000,000 bus., it may be estimated that there will be 695,000,000 bus. available to meet the demand of all the importing countries, which I have estimated at 625,000,000 bus. This will leave on 1st August, 1921, 70,000,000 of old wheat (besides the normal carry-over) in the exporting countries, and 36,000,000 bus. afloat—a sufficient, though not excessive, margin on the eve of the ripening of the new harvests in the Northern hemisphere.

It is greatly to the advantage of the importing countries that all five of the principal exporting countries have large surpluses to dispose of and will compete with each other. It is also noticeable that Britain, the chief importer, has already since 1st August, 1920, imported half her requirements for the year, and is at present, including her own harvest, well stocked with wheat, so that she can afford to wait for the new wheat, which will soon become available from the Argentine and Australia.

During the last six months there has been a marked fall in ocean freights, as was to be expected from the rapid increase in the quantity of tonnage available, owing to new launchings and the completion of re-conditioning and repairs. Many new ships are still being launched, and it seems probable that by 1st July, 1921, the world's steamer tonnage will be approximately 60,000,000 tons as compared with 45,000,000 at the outbreak of the war, while the demand for cargo space will still be less than the pre-war average demand. A further fall in

ocean freights therefore seems probable. The fall, which has already taken place, has made it possible for the importing countries to offer higher prices for their wheat to the Argentine and Australia, while reducing the c.i.f. cost of imported wheat, and enabled the British Government to reduce the price charged to millers for foreign wheat, a measure which may soon be expected to have the effect of reducing the price to the consumer of the British 4-lb. loaf.]

Owing no doubt to this improvement in the wheat position from the point of view of the importing countries, and to the consequent relaxation of their urgent demand for wheat from North America, there has been in the United States and Canada a very marked fall from the monopoly price they were enabled to charge six months ago, though prices there are still about double what they were before the war. They are still fluctuating somewhat violently, owing to the uncertainties of the future, among which may be reckoned the probable action of the Government of India. India has undoubtedly a large surplus of wheat which she would normally export, but this would lead to a serious rise in the price of wheat in India; and as the coming wheat harvest, to be reaped in May, promises to be poor, the Government may refuse to permit the export of more than the 15,000,000 bushels now being purchased for export. On the other hand, the wheat is there, and it would be very profitable for the holders if export were allowed, and if the winter rains prove favourable, the Government may permit a considerable export before 1st August next. It must also be remembered that in all probability millions of peasants in Russia now hold quantities of wheat they would be glad to sell to the highest bidder, and it is just possible that arrangements may be made to permit of the export of a considerable quantity before next August. If either or both of these events happen, a further fall in the world's price of wheat would probably take place (1).

(1) Latest reports as to conditions in Russia indicate that it is not at all likely there will be any considerable quantity of wheat exported from that country during the present grain year. On December 15 drought still prevailed in India, making additional exports improbable.—Editor's note.

SOWING OF WINTER CEREALS

United Kingdom: Early in December farm work was well forward. Increases in the wheat acreage were reported in the south, east and the midland counties of England, but indications are that there has been a decrease in the northern counties.

France: Sowing was practically completed on December 1. An official report confirms

that the new crop was seeded under very favourable conditions, and gives the acreage as considerably greater than that of last year. The new plant was forward and sturdy.

Spain: Reports state that the new crops were sown under favourable conditions, due to the abundance of rain.

Italy: Reports state that dry weather hindered autumn seeding in many sections. On December 1st it was indicated that the wheat area seeded was below normal. Later reports show that conditions have improved.

Roumania: It is officially confirmed that only a very small acreage has been planted with winter grain. The indicated total wheat acreage is less than 3,000,000 against 4,400,000 last year.

Germany: Early in December the new crops were reported to have had a bad start,

owing to droughty weather, but improvement was expected, as the drought had been relieved.

Austria: According to indications, where it had been practicable to do the necessary work the winter crops were in good condition.

North Africa: Early in December the condition of the new crops was reported as favourable.

India: On December 1 drought still prevailed and conditions were unfavourable.

FRENCH AGRICULTURE

Within two years after the armistice France has practically remade the vast area of her agricultural soil which was pitted and scarred beyond usefulness by the ravages of war. Figures received by the French Commission, in New York, show that out of 7,000,000 acres which were rendered unfit for cultivation by the effects of battle from 1914 to 1918, only 280,000 acres will not be in a condition to permit of sowing next spring.

The rest of the agricultural area has been restored, or will be restored, by the end of the current year. The reports to the Commission show that 4,000,000 acres, or more than half of the devastated farm land, are already under cultivation. The harvest has been so good that the French Government has been enabled to cancel contracts for the import of South American wheat into France.

The French Department of Agriculture has compiled the following figures giving the progress of France's efforts to feed herself:

	1920.	1919.
	Bush.	Bush.
Wheat.....	230,000,000	182,000,000
Rye.....	33,000,000	29,000,000
Barley.....	35,000,000	23,000,000
Oats.....	274,000,000	162,000,000

Considering that rye and barley are used for breadmaking in France, it is reckoned that the crop situation practically insures complete success in feeding the nation with home-grown cereals. Last year it was necessary to import 89,000,000 bushels of

wheat and flour. The improvement means a national saving in money and an agricultural restoration which brings a measure of prosperity to a large proportion of the population, which had previously been deprived of the means of livelihood.

THE AGRICULTURAL GAZETTE OF CANADA

LIVE STOCK STATISTICS

PRUSSIA.

Classification.	Sept. 1 1920.	June 1 1920.	Sept. 1 1919.	Increase (+) or decrease (-) compared with September 1919.	
				in number.	per cent.
Horses (1).....	2,507,503	2,494,498	2,429,783	+ 77,720	+ 3.2
Cattle.....	9,272,567	9,311,799	8,731,960	+ 540,607	+ 6.2
Sheep.....	4,372,584	4,652,265	3,574,960	+ 597,624	+15.8
Pigs.....	9,756,694	7,921,776	7,344,355	+ 2,412,339	+32.8
Goats.....	2,955,710	3,032,275	2,811,466	+ 144,244	+ 5.1

(1) Not including army horses.

BELGIUM.

Classification	1920	1919	Increase (+) or decrease(-)	
			in number	per cent
Horses (including mules and asses).....	198,154	173,954	+ 24,200.	+13.9
Cattle.....	1,292,271	1,151,826	+ 140,445	+12.2
Sheep.....	126,202	112,112	+ 14,090	+12.6
Goats.....	32,660	37,483	- 4,823	-12.9
Pigs.....	545,774	328,155	+ 217,619	+66.3
Poultry.....	3,839,853	2,349,439	+1,490,414	+63.4

DENMARK

Classification	July 15 1920	July 15 1919	Increase(+)or decrease (-)	
			in number	per cent
Horses.....	563,467	558,471	+ 4,996	+ 0.9
Cattle.....	2,286,408	2,188,142	+ 98,266	+ 4.5
Sheep.....	504,241	509,466	- 5,225	- 1.0
Goats.....	44,500	44,537	- 37	- 0.1
Pigs.....	1,007,861	715,909	+ 291,952	+40.8
Poultry.....	13,997,015	12,134,521	+1,862,494	+15.3

IRELAND

Classification	June 1 1920	June 1 1919	Increase(+) or decrease (-)	
			in number	per cent
Horses.....	631,654	624,501	+ 7,153	+1.1
Mules.....	27,077	25,582	+ 1,495	+5.8
Asses.....	226,367	222,469	+ 3,898	+1.8
Cattle.....	5,019,837	5,029,450	- 9,613	-0.2
Sheep.....	3,588,892	3,513,345	+ 75,547	+2.2
Pigs.....	980,078	977,963	+ 2,115	+0.2
Goats.....	247,187	233,287	+ 13,900	+6.0

THE AGRICULTURAL GAZETTE OF CANADA

NEW ZEALAND

Classification	January 31, 1920	January 31, 1919	Increase (+) or decrease(-)	
			in number	per cent
Horses.....	344,248	363,188	- 18,940	- 5.2
Cattle.....	3,059,445	3,035,478	+ 23,967	+ 0.8
Sheep.....	23,914,506	25,828,554	-1,914,048	- 7.4
Pigs.....	259,647	235,347	+ 24,300	+10.3

UNITED STATES FINAL CROP REPORT

The Department of Agriculture makes of the United States for the past three the following report of the principle crops years :

	1920.	1919.	1918.
Winter wheat, bus.....	580,513,000	729,503,000	558,449,000
Spring wheat, ".....	209,365,000	204,762,000	358,651,000
All wheat, ".....	789,878,000	934,265,000	917,100,000
Corn, ".....	3,232,367,000	2,858,599,000	2,582,814,000
Oats, ".....	1,524,055,000	1,234,754,000	1,538,359,000
Rye, ".....	69,318,000	88,909,000	89,103,000
Barley, ".....	202,024,000	161,345,000	256,375,000
Flaxseed, ".....	10,990,000	7,764,000	14,637,000
Potatoes, ".....	430,458,000	357,542,000	397,676,000
Hay, tons.....	108,233,000	109,152,000	89,833,000

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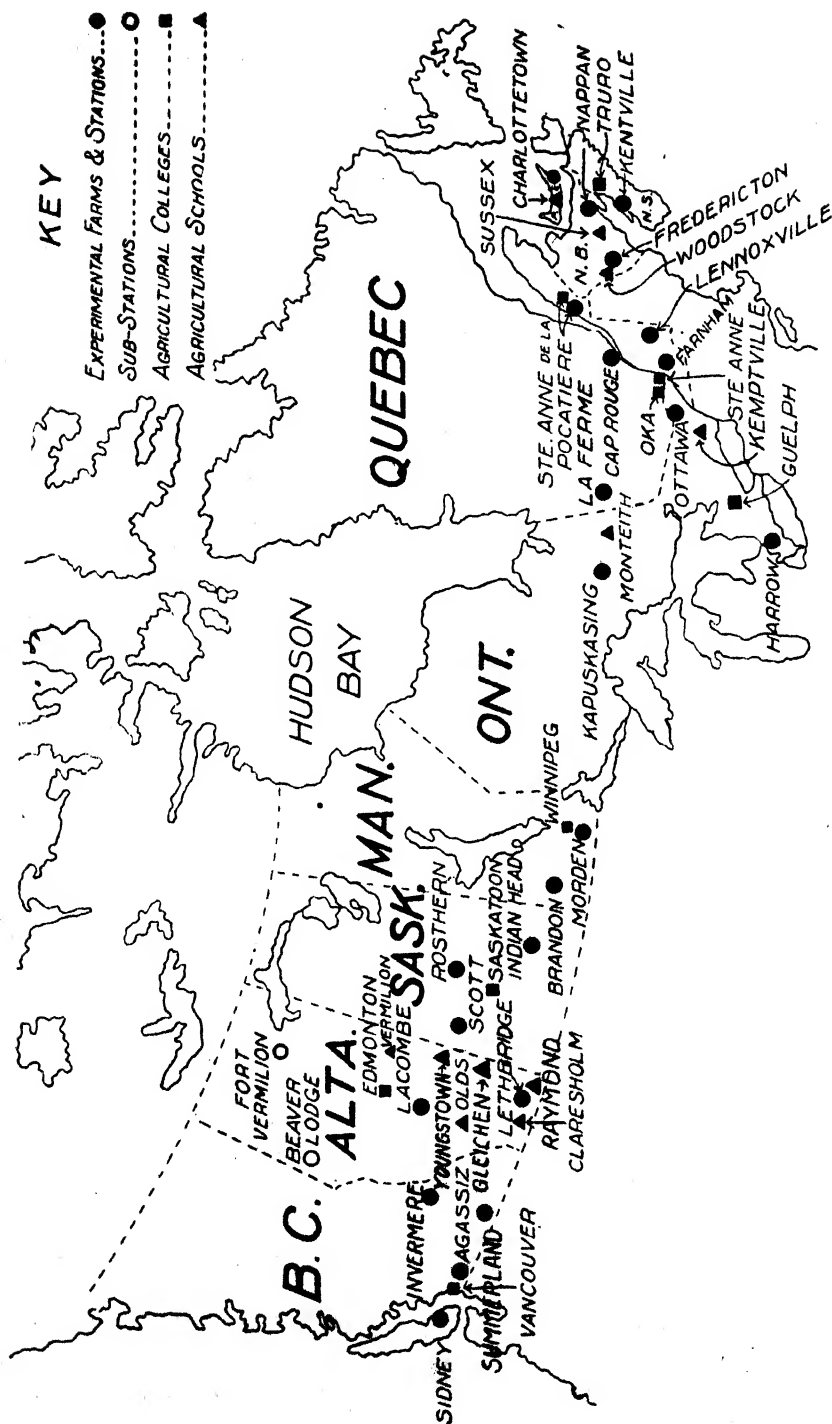
Vol. 8: No. 2

March—April, 1921

The AGRICULTURAL GAZETTE

OF CANADA

**Issued by the Dominion Department
of Agriculture, Ottawa**



MAP OF CANADA SHOWING THE LOCATION OF FARMS, STATIONS AND SUB-STATIONS IN THE EXPERIMENTAL FARMS SYSTEM, THE AGRICULTURAL COLLEGES AND AGRICULTURAL SCHOOLS

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J. B. SPENCER, B.S.A., Director of Publicity.

EDITORIAL COMMENT

IN four of the Provinces of Canada special Agricultural Schools have been established, designed to give instruction in vocational agriculture of less than college grade to country boys and girls. In this movement Alberta was the pioneer, and has already established six schools offering courses in agriculture and household science.

The school at Kemptville, Ontario, which is similar to the Alberta school in its scope and intention, was formally opened on February 18, although its two year course in agriculture began in the fall of 1920. This school has ample land for farming purposes attached to it, and is well equipped with the necessary school and farm buildings. It is the intention to make it a residential school, and under the able direction of Mr. W. J. Bell, the principal, a career of great usefulness may be predicted. The Kemptville School is being financed entirely from the Federal grant for Agricultural Instruction, and the schools in Alberta and elsewhere have also benefited to a large extent from the same fund.

In Prince Edward Island an agricultural school has recently been opened, while in New Brunswick the Carleton County Vocational School at Woodstock is offering similar courses. The experience in Alberta is that many farm boys and girls can be induced to attend schools of this kind who, for various reasons, cannot avail themselves of the benefits of an agricultural college course. The students are usually recruited from the ranks of those who have left school, and yet realize that they are insufficiently equipped for their life work. Nevertheless, such schools should lead many to take a more advanced course and thus prove a recruiting ground for the agricultural college. The schools referred to are dealt with in detail in this issue of the *Gazette*.

* * *

INSECTS and weeds are among the most formidable rivals with which the farmer has to contend. In Western Canada, in particular, weeds take an increasing toll.

Concerted action has now been agreed upon by the agricultural departments of the three prairie provinces in the operation of a Weed Special train to spread a knowledge of effective control methods.

THE economic value of birds to agriculture, both as regards insects and weeds, is not sufficiently realized. As the natural guardians against destructive insects, they are the farmer's chief ally. Their extermination would soon see mankind at the mercy of the insect world, and they should be protected by every possible means. The instinct to kill the wild things, so persistent in youth, is a survival from primitive man which should be controlled by instruction and enlightenment. The study of bird life in the schools and the formation of bird clubs, both for young people and adults, should accomplish very useful results in this connection.

* * *

THERE are in operation many organizations for the purpose of encouraging the production and use of good seed, and the value of Field Crop Competitions, Seed Centres, Canadian Seed Growers' Association and similar organizations is inestimable. A number of timely articles dealing with this subject will be found in this issue.

* * *

SOME useful and interesting articles will be found in this issue describing what is being done in certain High Schools in Ontario and British Columbia in connection with the teaching of agriculture. In a number of Ontario High Schools special departments of agriculture have been organized, while in the British Columbia schools of this grade agriculture is taught as part of the regular curriculum under the guidance of district supervisors, who are agricultural specialists. The problem facing those responsible for educational policy is to provide adequate educational opportunities for those destined for country life, and this laudable effort to solve it is apparently meeting with a measure of success that is highly encouraging.

* * *

AN important prediction is made by Professor G. H. Hutton, Superintendent of Agriculture for the Canadian Pacific Railway, in his article, Sunflowers for Silage, as to the value of this crop to the stock growers of Western Canada namely, that it will be generally grown for ensilage purposes before many years have passed, and will bring with it millions of dollars of increased wealth. Reports coming to hand state that one rancher is planning to plant one hundred acres to sunflowers, and that another large farmer, who built and filled two silos with this crop in 1920, expects to add five more to his equipment in 1921, all to be filled with sunflowers. These are evidences that the sunflower as a silage crop has arrived or is fast arriving.

* * *

SINCE the settlement, not many years ago, of the Provinces of Saskatchewan and Alberta, great havoc has been wrought by the blowing away of the top soil from the cultivated land. In that comparatively short period, there are areas where the productive surface has been entirely removed through the agency of wind. Unless this devastation is checked, much of the country will in another twenty years be rendered unproductive. The solution of this problem appears to lie largely in the planting of tree belts as wind breaks. That this is being and can be successfully undertaken is apparent from an article appearing in Part IV of this issue which plainly indicates that the problem can be solved by planting in sufficiently wide belts, and by conserving soil moisture. Precipitation is sufficient for tree growth provided the right methods are adapted to retain it. An encouraging feature of the situation is found in the fact that, with settlement, the prevalence of prairie fires is being lessened, thereby permitting

natural forestation to take place by encroachment from the tree-clay areas which bound the prairie country. So long as the prairie was swept by fire from year to year, tree growth could make no progress. Tree bluffs are now making notable headway, but natural methods are too slow to cope with the situation, and must be augmented by the systematic planting if this menace to prairie farming is to be met and overcome.

* * *

IN the current issue of the *Agricultural Gazette* will be found a series of articles describing the system adopted in several of the Provinces in the conduct of Home Projects as part of a course of instruction.

Attention is called to the list of options in agriculture presented to the students at the Chilliwack, B.C., High School. The list indicates that Mr. Readey, the Instructor in Agriculture, is making an earnest attempt to get away from mere play-like projects, and is pursuing the real thing in a thoroughgoing way, having first obtained the backing of the parents and of the boys and girls concerned. The *Gazette* would welcome an expression of opinion from those interested as to the practicability of conducting such high school projects as Mr. Readey has outlined.

* * *

THE Director of the Homemakers' Department of Saskatchewan University, Miss Abbie DeLury, is strongly urging Homemakers' Clubs to hold regularly organized meetings of men and women, boys and girls, for entertainment and instruction, believing that the best results will be attained by men, women and children working together with a common object. As a common meeting ground of interest, singing, reading and bird clubs are recommended. With regard to the latter, it is pointed out that the conservation of bird life in Saskatchewan is very important in the interest of agriculture, as it is elsewhere, and that bird clubs might co-operate with governmental effort towards this end. It is stated in a circular recently issued that children have not the same sense of responsibility when working alone as when working with older people, a view in which leading educational authorities concur.

* * *

THE Commercial Feeding Stuffs Act, passed at the 1920 session of the Dominion Parliament, is now in force, and the Seed Commissioner in an article appearing in this issue of the *Gazette*, outlines the means to be employed to give effect to its provisions. Formerly, the compounder of commercial feeds was not required to make known the constituents of the mixture, and certain brands of stock feeds placed upon the market were found to contain harmful weed seeds and ergotized grain to the great detriment of the health of live stock.

The present Act provides that every sack, bag or other container of feeding stuffs sold or offered for sale must have a tag or label in a conspicuous place on the outside containing the name or brand of the contents, the name of the manufacturer and the name of every ingredient, registered number and the analysis as guaranteed by the manufacturer, which shall show the percentages of the content in protein, fat and fibre.

The regulations made by the Minister, under the Act, give the names of weed seeds known to be injurious, and prohibit their employment in compounding feeds. It is further provided that no feed shall contain over five per cent of weed seeds possessing good feeding value, nor over two per cent of chaff, dust, straw or other fillers. No chopped feed shall contain over one vital, noxious weed seed to the ounce. A copy of the Act will be supplied on request by the Publications Branch of the Dominion Department of Agriculture.

PART I

Dominion Department of Agriculture

THE FINANCIAL BENEFIT TO CANADA OF THE WORK OF THE DEPARTMENT OF AGRICULTURE

A SURVEY of the history of the Federal Department of Agriculture for the past ten or fifteen years reveals many activities which have, directly or indirectly, led to the financial benefit of Canada. Any line of endeavour which has resulted in increasing the output or improving the quality of agricultural products falls within this category, as do all successful efforts to minimize loss from preventable causes, to dispose of such products more profitably or to utilize to better advantage the output of farm, field, and garden. The work carried on by the Department of Agriculture is naturally of so varied a character, and so diverse in its objects, that it is difficult to present the situation in such a manner as to show the total results in the form of money. With some lines it is possible, from official figures, to make a fairly close estimate of the value, in dollars and cents, of some particular policy; but in others—mainly those of a research or preventive character—the results have been in the one case so far-reaching and in the other so successful that it is impossible to give any figures, the correctness of which could be demonstrated.

The work of the Dominion Department of Agriculture may be roughly divided into research, investigation, illustration, assistance, prevention, propaganda, and administration. These lines are to a certain extent interdependent: a new and potentially valuable discovery made in research work is

not of maximum benefit until its possibilities have been thoroughly investigated by experiment, its application demonstrated, and its advantages made known by means of publicity and propaganda.

When considering any one phase of a beneficial discovery or policy made or operated by the department, it is well to remember and give due credit to the other phases of the department's work which have made its maximum application under optimum conditions possible.

Returns from Plant Breeding

As might be surmised, research work has laid the foundation for the introduction of many new plant varieties, for the control and eradication of many destructive live stock and plant diseases, and for the introduction of new and more profitable farming methods, all of which have resulted in direct and, in some cases, enormous gain. Perhaps the most outstanding work of this character has been the production, by cross-breeding and selection, of new varieties of grain. The discovery of Marquis wheat by the Cereal Division of the Experimental Farms Branch, has, during the past five years, meant an average increased income to the wheat growers of the three Prairie Provinces of over \$20,000,000 annually, while careful calculations show that the introduction of Preston, Stanley, and Huron wheats, also Experimental Farm originations, have resulted in an average annual increase

in value of nearly half a million dollars to the wheat crop of the other provinces. The introduction of Victory, Daubeney, and especially Banner oats can be shown to be responsible for an increase of over \$8,000,000 annually, while other new barleys, flax, peas, and other grains are responsible for an annual increase of some \$3,000,000. New varieties, such as Ruby wheat and the Liberty oat, not yet widely distributed, should in the next few years add many millions to the wealth of the country as a result of the department's work.

Similar plant breeding work with orchard and garden crops on the Experimental Farms has led to the discovery of new and valuable varieties of fruits and vegetables, such as the Melba apple, Early Malcolm corn, Alacrity tomato, etc., the value of which, although no accurate estimate can be given, is undoubtedly very considerable. The production by cross-breeding of hardy varieties of tree fruits should also mean a great deal to those districts, especially in the Prairie Provinces, where varieties suited to other climates do not grow to advantage.

Although the breeding work with forage crops is still in its infancy, some valuable discoveries have already been made, notably a perennial red clover, while other new varieties of forage crops have been isolated and fixed which should mean a production at least 15 per cent higher than with those varieties commonly used at present.

Chemistry Investigations

Research work by the Division of Chemistry, upon the value of which, of itself, no definite value can be set, has undoubtedly had far-reaching effects in determining the path followed in other lines of endeavour. Among these may be mentioned the investigations as to the value of clover, alfalfa, and other legumes in the maintenance and increase of soil fertility; an investigation into

the soils of Western Canada; demonstrations of the value of fertilizers; the conservation of soil moisture as affected by cultural methods; and many others too numerous to be mentioned here.

Disease Control in Animals and Plants

In order to discover means of eradication and control for live stock and plant diseases, as well as insect pests, other research work has been carried on by the Health of Animals Branch, the Division of Botany, and the Entomological and Seed Branches. While other agencies, in most cases sub-branches of the same units, have been responsible for the effective application of the control measures thus discovered, the initial value of these control measures can be counted to the credit of research work. For instance, the discovery of the organisms of dourine and the perfection of a laboratory test for this disease have resulted in the disappearance of dourine from Canada, while investigations into the causes of redwater in cattle have also been of great value. As to plant diseases, it is estimated that crops to the value of over sixteen million dollars are saved each year by reason of the preventive measures against smut introduced by the Division of Botany, while another sixteen million dollars are saved annually by control measures for late blight and rot of potatoes and the use of certified potato seed, also introduced by this division. In the Seed Branch, research work in the laboratories has led to the greater utilization of elevator screenings as live stock feed, by the perfection of a system for separating the harmful constituents from the original screenings. This has resulted in approximately 100,000 tons of screenings annually being made of maximum value to the live stock feeder.

Losses from Injurious Insects Lessened

It is estimated that every year the annual losses to our field crops alone,

due to insect depredations, amount to \$125,000,000. This loss would undoubtedly be far greater were it not for the activities of the Entomological Branch. While the larger proportion of the work of this Branch has consisted of the application of control measures, research work aiming at the discovery of better and cheaper insecticides is only one of the many lines of research work carried on. This one item alone should mean the saving of thousands of dollars in the cost of production of the crops affected. Other investigations are being made into the habits and means of control for insects affecting live stock, fruit, grain and forest trees.

Improved Methods of Field Husbandry

Experiments conducted over many years and in all parts of Canada by the Experimental Farms Branch have led to the greater use of crop rotations and the discovery of the best and most profitable rotations for each district. It is estimated that the efforts of the department in this direction are responsible for an increased annual revenue in Ontario alone of about \$32,000,000, while the system of summerfallowing in the prairie provinces, also advocated by this Branch is thought to be responsible for an increased revenue of \$90,000,000 annually.

It would be exceedingly difficult to estimate, with any degree of accuracy, the pecuniary benefits derived by the country from the purely investigational, illustrative and propaganda work of the department, on account of the many varied outside interests that would have to be taken into account, but that this work has a great effect upon production, and consequently upon the financial returns to the country from the agricultural industry there can be no doubt. The chief medium for carrying on investigational work with farm products and farming methods is the Experimental Farms Branch. Some of the work of this branch has been treated above as research work, although even

this latter depends upon experiment and investigation, carried on under ordinary farming conditions, to develop its full usefulness. During the last thirty years, many experiments have been carried on and many investigations made on the Experimental Farms, some of which have served to revolutionize farming methods.

Live Stock and Dairy Development

Consider the work with live stock. To mention only a few instances, the introduction and distribution of pure-bred live stock, the illustrations of the benefits of pure breeding, the grading up of grade flocks and herds by the use of pure-bred sires, and cross-breeding work to combine the desirable qualities of different breeds have all been demonstrated on the farms and the results placed at the disposal of the farming community. If only a small proportion of the advice based on the findings from these experiments has been followed, and there is very good reason to believe that a large proportion of the farmers of this country look to the Experimental Farms for advice on these matters, the annual benefit to the country by reason of the improvement in the stock carried must amount to millions of dollars. Investigations into housing conditions for live stock have led to great improvements in this regard all over Canada, while steer feeding experiments, held year after year on nearly all the Experimental Farms, have indicated the best and most economical methods and feeds to be used. Dairy utensils, milking machines, and other dairying equipment have been tried out and the results of these trials passed on in the form of advice to dairy farmers, while the same may be said of labour-saving equipment, notably the self-feeder for hogs. Valuable work has also been done in the introduction and continual advocacy of record keeping, leading, there is no doubt, to a great saving to the farmers following the method, by pointing out unprofitable members of their herds. Many feeds

have been tried out, and the desirable and undesirable qualities of each discovered, while the Branch has co-operated to a certain extent with the Health of Animals Branch in the trials of various remedial measures for live stock diseases.

Increased Revenue from Poultry

With poultry also much valuable work has been done, the investigation and demonstration of better methods of housing, feeding, incubation and brooding having already led to an estimated increased revenue from the industry of many millions of dollars, while work now being carried on in the investigation of poultry diseases and better housing conditions for poultry will undoubtedly mean several millions more in the course of the next few years.

Flax and Tobacco Stimulated

A good proportion of the increased value and importance accruing to the tobacco industry of this country can be directly credited to the work of the Tobacco Division. By its variety tests, its distribution of seed and its investigations into harvesting and warehousing methods, as well as its surveys of tobacco soils, the tobacco growers of Ontario and Quebec have been shown the best varieties to grow and the best production methods to follow with this crop. A conservative estimate of the value of the services of the Tobacco Division to this industry is about \$3,000,000 annually.

One phase of the work of the Experimental Farms Branch, that of the Flax Division, is worthy of an important place in the consideration of the value of the department's services to the agricultural industry of this country. During the past three or four years, the flax industry, both in connection with fibre and seed, has been growing in importance by leaps and bounds. Much of this improvement can be directly traced to the activities of the department, and it is hoped that future work along this line

will result in the saving of much material, now lost, representing an annual value of millions of dollars.

The work with bees, along the lines of winter feeding, housing, and the discovery of new districts suitable for bees, has also meant a considerable increase in revenue from this source.

Illustration Stations and Exhibits

In communicating its findings to the farming community, the Experimental Farms Branch uses the media of demonstrations, publications, and exhibits. The value of the last two cannot be over-estimated, and in its demonstration work it has, besides the Experimental Farms proper, a number of Illustration Stations scattered all over the country. As a concrete example of the value of these Illustration Stations, one case in particular is cited. Through the example set at one of these stations, farmers in the vicinity have been induced to turn their attention to the growing of a small area of clover seed. In this district the area sown, 850 acres in all, resulted last year in a crop of clover seed worth \$50,000 more than would have been the case with the regular crop.

Promotion Policies

As to those policies of the department under which direct financial or other assistance is given to farmers, it is perhaps more easy to make definite estimates. The chief branch having control of such policies is the Live Stock Branch, and all the policies in operation have for their objective the development of the live stock industry, and the improvement of the quality of live stock carried. One phase of this work is the provision of financial assistance for the procuring of pure-bred male stock to be used in various districts. The effect of this policy has been threefold. Not only has it, by providing pure-bred animals for service, resulted in the production of higher class progeny from grade

females, but it has also brought about the use of more pure-bred males and the holding of larger stocks of good class females by the farmers and stockmen of the districts served. With horses, the increased value to date is estimated at \$400,000; with cattle, \$15,000,000; with swine, \$2,200,000; and with sheep, \$1,000,000, all as a result of this policy.

The Record of Performance work, aiming at proper selection of sires for dairy cattle, has resulted in an increased value in our dairy herds of one and a half million dollars to date, while the operation of the free freight and carlot policies, having as their objective the prevention of sale for slaughter of female stock fit for breeding purposes or unfinished stock, are estimated as being worth \$3,500,000 and \$3,800,000 respectively.

Another line of work that has shown financial results has been the grading and co-operative marketing of wool. Increased prices, varying from four to seventeen cents per pound, have been paid for the graded over the ungraded article, so that it is calculated that the financial benefit from this policy alone during the past five years has been well over \$1,000,000.

By the purchase and distribution of various feeds, such as standard stock feed, corn, oilcake meal, and other mill feeds, as well as by the success of its efforts towards the reduction of freight tariffs on feeds, the Feed Division of the branch has effected a saving to the farmer of over \$500,000, while the Poultry Division considers \$10,000,000 as a fair estimate of the increased value of the poultry industry due to its efforts, by the provision of export and inspection facilities, marketing intelligence, and flock improvement.

Administration of Regulatory and Control Measures

The work of some of the branches of the department consists very largely of the administration of control measures

to prevent losses from disease and other causes. The very character of the work renders it impossible to give any monetary value to the effective administration of these measures. Fortunately, in the past, success has always attended the efforts of the department in preventing or controlling disease, but from the experience of other countries where the regulations have not been so successfully enforced, it is easily seen that the department's inspection service is of untold value. It is only necessary to point to the enviable reputation which many of our Canadian agricultural products have obtained on the export market, and to understand that this reputation largely depends upon efficient inspection in order that this high standard may be maintained, to realize that the value of inspection, in this regard alone, must be enormous.

Canadian live stock has been kept free from foot and mouth disease, pleuro-pneumonia, and other contagious diseases for many years. Glanders, dourine, and anthrax have been practically eradicated, while hog cholera is being kept under control. Tuberculosis and contagious abortion we still have, but measures are being taken to stamp out these diseases, while mange has been isolated in one territory and it is hoped that considerable progress will be made in its eradication this year. The effective quarantine system maintained has prevented the introduction of many live stock diseases into this country.

With plants, efficient inspection and control measures have succeeded in stamping out powdery scab and potato canker, two destructive potato diseases; while the Entomological Branch, by its work in connection with insects, has succeeded in reducing by a large proportion the losses previously sustained annually from this cause.

Somewhat similar work, though of a slightly different character, is the seed inspection service carried on by the Seed Branch. This service has resulted in the use of an ever-increasing proportion

of seed of the first quality and has prevented the sowing in Canada of dirty and non-vital seeds likely to result in the propagation of weeds and resulting deterioration of the crops.

In the Dairy and Cold Storage Branch, the employment of cargo inspectors has undoubtedly resulted in the saving of large quantities of agricultural products, as, mainly owing to the efforts of this Branch, improved facilities have been provided for the shipment under proper conditions of dairy products. The cow-testing work of this Branch may also be mentioned, as it is calculated that, by reason of the propaganda carried on in this connection, the average annual milk yield per cow has been raised from 3,000 to 4,000 pounds. This increase is estimated as being worth at least \$150,000,000 during the past ten years.

The Fruit Branch, by the administration of the Inspection and Sales (Fruit Marks) Act, has been responsible for the prevention of a great deal of loss previously sustained through the improper packing of fruit. It has also given great attention to fruit markets, and by following its advice shippers have been able to obtain much better prices for their fruit. The effective enforcement of this Act has resulted in the standardization of fruit grades, the stabilizing of the fruit market, and the establishment of a better reputation for Canadian fruit products than was previously enjoyed.

Extension and Publicity

The propaganda work of the department is carried on by means of addresses, publications, press articles, demonstrations and exhibitions. The value of this work cannot be over-estimated, as, by

means of at least one of these channels, the department is able to get into touch with every farmer of the Dominion. If only a very small percentage of the information disseminated through these channels falls upon fruitful ground, the harvest reaped therefrom in increased production, reduced waste and better quality product should outweigh the cost a thousandfold.

While a certain portion of the efforts of most of the branches is directed towards the administration of various Acts of Parliament, such as the Animal Contagious Diseases Act, Meat and Canned Foods Act, Live Stock and Live Stock Products Act, Dairy Industry Act, Cold Storage Warehouse Act, Destructive Insect and Pest Act, Seed Control Act, Agricultural Instruction Act and Inspection and Sale Act, each of these has been devised and is being administered in the interests of agriculture, and the efficient administration of each of them results in some phase of the industry being carried on under better conditions, calculated to give better results, and thus increase the revenue returnable to the country at large from this great industry.

To sum up, while certain phases of the work and certain discoveries made by some of the branches of the Department of Agriculture can be shown to be responsible for a definite increase in revenue, the majority of their activities are of such character that it is impossible to make any reasonably correct estimate. The above facts, however, are sufficient to show that the operations and policies of the Department have already been responsible for increased returns to the country of many million of dollars and there is no doubt that, as the years go by, and the activities of the department widen in their scope, this should be increased to billions.

ADMINISTRATION OF THE FEEDING STUFFS ACT, 1920

BY GEORGE H. CLARK, SEED COMMISSIONER, OTTAWA

THE objective of the Feeding Stuffs Act is to establish standards of nomenclature for feeding stuffs and ingredients thereof, and also standards of quality, so far as practicable, for each kind of feed sold in the Canadian market.

Standards to be Established

There are, for instance, nearly eight hundred millers in Canada whose ideas as to what should constitute bran and also shorts or middlings would seem to be highly variable. To establish a standard for these products representatives of the Western Live Stock Union, Eastern Live Stock Union, and the Canadian Dairy Council who serve on the advisory board under the Feeding Stuffs Act, have been requested to meet in conference at Ottawa on February 4th with three representatives of the Canadian National Millers' Association. It is also the purpose of this conference to agree upon type samples of these products, which samples may thereafter be placed in the hands of every Canadian miller and also every seed and feed inspector for his guidance in respect of the observance of the Feeding Stuffs Act.

Organization

For the purpose of administration of the Seed Control Act and Feeding Stuffs Act the territory has been divided into inspection districts, as follows:

1. The Maritime Provinces.
2. The Province of Quebec.
3. Western Quebec, including the counties of Wright, Pontiac, Temiskaming; Eastern Ontario, and Northern Ontario as far west as Lake Nipigon.

4. Western Ontario.

5. Northwestern Ontario and the Provinces of Manitoba and Saskatchewan.

6. The Provinces of Alberta and British Columbia.

The district inspector is in direct charge of the inspection work for each district, and has under his immediate direction from five to nine seed and feed inspectors each allotted to a definite sub-district. These seed and feed inspectors are required to be competent in the technique of both seed and feed inspection.

The administration of these laws is based on the signed statements of official analysts named as such by order of the governor in council on the provisions of the respective acts. A laboratory service for seed inspection is now provided for each of district No. 5 and district No. 6. The laboratory service for all of the districts lying east of Lake Nipigon remains centralized at Ottawa, and an attempt has been made to provide laboratory service for botanical analyses under the Feeding Stuffs Act in the Ottawa laboratory. The service of chemistry analyses is obtained from the laboratory of the chief analyst of the Department of Public Health.

It would seem to be necessary to the efficient administration of these laws to provide laboratory service also for the four inspection districts located east of Lake Nipigon; but for the present it has been deemed quite impracticable to secure competent technical help necessary to the establishment of these laboratories.

THE MARKETING AND DISTRIBUTION OF FRUIT

FROM AN ADDRESS DELIVERED BY C. W. BAXTER, FRUIT COMMISSIONER, OTTAWA, AT
THE ANNUAL MEETING OF NOVA SCOTIA FRUIT GROWERS

IT is doubtful if there are any questions more deserving of the earnest consideration of fruit growers at the present time than marketing and distribution. If the establishing of adequate marketing facilities is necessary to the success of industries whose product is non-perishable and whose output can be increased or decreased in a very short time, is it not essential to the success of the fruit industry—the product of which cannot be curtailed to any extent within several years and cannot be carried over from one season to another—that an equalization of production and distributing facilities be strictly adhered to?

A review of fruit marketing conditions in Canada will show that unsatisfactory results have recurred with each big crop. In years of small crops, when the demand was equal to or greater than the supply, the need for wider markets and centralized marketing organizations was not felt. The bulk of the crop was absorbed within a comparatively small area. When the crop was large or unusual conditions had to be met, there was not sufficient time to look for new markets and a large portion of it was disposed of on a f.o.b. basis and the remainder consigned to the nearest marketing centre. The returns were therefore unprofitable and the resultant conclusion was—overplanting.

In order that any industry may succeed and obtain the best results from the investment, there are four essentials which must be observed: First, the quality of the product should be the best; second, the product should be standardized and maintained; third, the best business ethics should be observed; and fourth, facilities should be provided for securing the widest distribution possible. Advertising for the purpose of increasing consumption is to-

day considered another necessary factor to success, and standardization of a product has been a large factor which contributed to the success of advertising campaigns and in the development of new markets. It is impossible to successfully advertise a commodity unless it has certain desirable characteristics which are uniformly present at all times. Such uniformity and the establishment of brands can be secured only through standardization and concerted action.

It is true that certain grades have been established in Canada by Federal legislation, and while these have done much to advance the industry, they are only minimums but allow considerable scope for individual and concerted enterprise. It is a debatable question whether the adoption of fixed grades would be practical and benefit the fruit industry to any great extent. In the writer's opinion definite grades by legislative enactment are not desirable. Unfortunately there are many packers and some fruit growers' organizations who, in order to avoid an infraction of the law, grade their fruit as close to the minimum as possible. Such a practice evinces a failure to realize that quality is a great factor in the fruit world today, greater, in fact, than at any time in the history of the fruit industry, and that such a practice is unprofitable. While the grading definitions established by law have done much for the industry and may always be necessary, the best results can only be secured by the adoption of definite grades. Although a degree of success has been attained by standardization where grading and packing have been done in orchards or privately owned packing houses, generally speaking, there is an extreme lack of uniformity. The best results have been obtained by entirely eliminating orchard packing and handling the crop

through one management—namely, the central packing house. By this means employees have no incentive to depart from the fixed grades.

In addition to the adoption of fixed grades, it is necessary to observe every care in handling the fruit from the tree to the market to ensure its keeping and prevent loss. In this respect there is much room for improvement in Canada, especially where apples are packed in barrels. If packers had an opportunity of examining their work some weeks after the fruit is packed, they would realize the necessity for greater care.

In the matter of distribution the tendency of individual effort has been towards large centres. This is not to be wondered at, as the cost of developing new markets entails considerable expenditure and it is out of all proportion to the value of the crop. If the crop is not large there is little or no difficulty in selling on an f.o.b. basis, but when the crop is large there is comparatively little buying, and the only alternative is to consign. Very soon the large centres become overstocked, while others are under-supplied. In order to avoid these unsatisfactory conditions, the area of distribution should be extended and business connections established in every market which is large enough to handle the product in carload lots. The cost to the individual producer of establishing such a system when undertaken by an efficient organization is infinitesimal.

Transportation has become so important a factor in distribution that fruit growers and shippers cannot afford to defer the establishment of the necessary organization to cope with the distribution of the crop. Not only is it desirable that growers and shippers in each province should have such an organization, but these units should co-operate in dealing with the many problems which arise from time to time and are national in character.

In view of the conditions affecting the marketing of the 1920 apple crop, which up to the present have resulted in the

loss of hundreds of thousands of barrels of apples and a weakening market at home and abroad, we might well ask the question: What of the future? Do not these conditions indicate that there has been overplanting? If we look no further than the present crop conditions, we might be justified in coming to this conclusion, but if we look back to 1912 and review conditions from that year up to the present, we have every reason to feel optimistic, provided fruit growers will concentrate their efforts towards stabilizing the industry.

It will be remembered that, generally speaking, the returns from the big crop of 1912 were unprofitable to the grower. Again in 1914 with a big crop and market completely disorganized, growers had further cause to feel discouraged. Planting ceased and orchards were neglected. Then followed the severe winter of 1917-18 that destroyed thousands of trees in Quebec, Ontario, and the Eastern States. These have not been replaced, nor have the plantings since 1914 been sufficient to replace those which have died from general causes. I am not aware that statistics are available to support these statements, but from various estimates which have been obtained, it would appear that as regards apple production, we are where we were 25 years ago. The apparent inclination of consumers to curtail buying is being reflected in the apple market at the present time, and prices have declined. The cost of production, however, has not yet been materially reduced, and it is difficult to forecast what labour conditions will be during the next two years, but the outlook is such as should warrant the expenditure necessary to maintain our orchards in the best condition possible and use every means to produce quality fruit.

If we are to prevent a repetition of the unsatisfactory conditions which have recurred with each big crop, it is essential that there be more co-operation and co-ordination in its marketing and distribution.

THE PRESENT STATUS OF THE DAIRY INDUSTRY OF CANADA

FROM AN ADDRESS DELIVERED AT THE NOVA SCOTIA DAIRYMEN'S CONVENTION BY J. A.
RUDDICK, DAIRY COMMISSIONER

THE extent and volume of the dairy business of Canada is shown by the following figures:—

QUANTITIES AND VALUES OF DIFFERENT DAIRY PRODUCTS IN 1919.

Products.	Quantities.	Values.
Cheese.....	Lbs. 167,734,982	\$44,205,794
Creamery butter.....	" 103,890,707	56,371,985
Dairy butter.....	" 125,000,000	56,250,000
Whey butter.....	" 1,396,814	661,373
Condensed and evaporated milk.....	" 78,006,237	11,214,165
Milk powder.....	" 6,591,099	1,539,272
Sterilized milk.....	" 7,460,400	852,080
Condensed skim milk.....	" 494,973	32,921
Casein.....	" 199,013	32,588
Ice cream.....	Gals. 2,892,974	3,715,488
Cream.....	Lb. B. Fat 6,380,727	4,718,678
Whey cream.....		521,420
Milk, used as milk.....		72,000,000
Total.....		\$252,715,405

"Dairy butter" and "Milk, used as milk" are estimated. All other figures are from the Dominion Bureau of Statistics.

Production is steadily increasing in every province, as is indicated by the increase in the number of cows, and the further fact that the yield per cow has been greatly improved. There has been a tendency in Ontario of late years to divert milk from the cheese factories to

condensed milk and milk powder factories, and the demands of the growing towns and cities for milk, cream, and ice cream, have made further inroads. The war production of condensed milk was greatly in excess of peace time requirements, and the present check to that particular branch of the industry is undoubtedly the result of over production.

Creamery butter production is increasing in every province, as the following tables shows:

CREAMERY BUTTER PRODUCTION IN CANADA

Province	1910	1915	1917	1918	1919
	Lb.	Lb.	Lb.	Lb.	Lb.
Prince Edward Island.....	670,908	539,516	597,271	641,754	905,752
Nova Scotia.....	354,785	1,240,483	1,746,662	1,756,905	2,107,429
New Brunswick.....	849,633	776,416	565,699	660,010	910,504
Quebec.....	41,782,678	36,621,491	34,392,562	36,761,057	37,681,366
Ontario.....	13,876,888	26,414,120	28,714,352	29,397,485	33,903,562
Manitoba.....	2,050,487	5,839,667	7,050,921	8,436,962	8,268,342
Saskatchewan.....	1,548,696	3,811,014	4,220,758	5,009,014	6,622,572
Alberta.....	2,149,121	7,544,148	8,943,971	9,021,765	11,822,890
British Columbia.....	1,206,202	1,204,598	1,294,743	1,581,924	1,668,290
Totals.....	64,489,398	83,991,453	87,526,939	93,266,876	103,890,707

THE AGRICULTURAL GAZETTE OF CANADA

Canada exports only 20 to 25 per cent of her total dairy production. The record for the fiscal year ended March 31, 1920, shows a total value of dairy produce ex-

ported of \$56,398,083, made up of the following quantities and values for different products:—

EXPORTS FOR THE FISCAL YEAR ENDED MARCH 31, 1920.

	Quantities.	Values.
	Lbs.	\$
Butter.....	17,612,603	9,844,359
Cheese.....	126,395,777	36,336,863
Condensed and evaporated milk.....	54,247,498	8,517,771
	Gals.	
Fresh milk.....	1,985,113	576,666
Fresh cream.....	795,780	1,122,424
Totals.....		<u>\$56,398,083</u>

In 1914 the total value of the dairy produce exported amounted to only \$21,193,168. The increase is due largely, of course, to higher prices, but there was also an increase in the quantities of all products except cheese, which shows a slight falling off. Let me say here that altogether too much stress is laid on the fact when there happens to be a decrease in the production or export of any particular product. The making of cheese, butter, or condensed milk is only a means to an end, the end being the best possible return for the milk. It is the total production of milk which is the important thing, and so long as it continues to increase we need not worry about the ups and downs of cheese making, butter making, or any other branch of the industry. Behind any such tendency there is always some very good reason, and there is no immediate probability that any of the well-established branches of the industry will be extinguished or suffer materially by reason of decreased output or export.

At the present time the expansion of the industry, as far as manufactured products are concerned, seems to favour creamery butter making, and there is

very good reason to believe that the present rate of increase in this branch will be maintained or even accelerated. The prairie provinces have great potentialities for butter production.

On the whole one feels justified in saying that the outlook for dairying is just as bright as it ever was. During the war years you were encouraged to produce with the argument that the war prices would prevail longer for dairy produce than for almost any other farm product. The present situation proves that this view was correct.

There is a market for all we can produce in the United Kingdom, and it is the best market in the world. Normally it is practically the only market worth considering.

If we had five or six times as much butter for export to the United Kingdom as we now have our position would be much better than it is with only fifteen or sixteen million pounds to spare. This quantity is too small and too irregular in supply to secure a well established position in the market, like that which our cheese has attained on account of being the largest item in the imports of the Old Country, in addition to the fact that it leads in point of quality.

THE POULTRY WORK OF THE EXPERIMENTAL FARMS

High-producing Strains Being Developed

BY F. C. ELFORD, DOMINION POULTRY HUSBANDMAN, OTTAWA

AT the Central Experimental Farm, and at practically all the Branch Farms and stations throughout the Dominion, investigations and experiments in connection with poultry keeping are being carried on. The development of high producing strains is one of the chief enterprises. Pedigree breeding is carried on at the Central Farm and at the Branch Farms, and after four or five years of special breeding and selection, we have produced birds and strains of a very high productive capacity. At Kentville, N.S., at the present time, our 11 breeding pens are full of birds that in their pullet year laid average of 197 eggs, the highest bird laying 270 eggs in 52 weeks. It was at this station that one Barred Rock pullet laid 104 eggs in 104 days. At other stations in the Maritime provinces similar work has been done, 256 eggs having been reached at Fredericton. In many sections where a few years ago it was exceptional to get ten or twelve dozen eggs a year from a hen, now there are hundreds that go from 150 to 250.

In Quebec, high production has been obtained. In the Eastern Townships, at Lennoxville, 266 eggs have been reached, a number have gone over the 200 egg mark, while from 150 to 200 is quite a common record.

In the Prairie Provinces, the Experimental Farms have demonstrated that, contrary to the general belief, a prairie climate is not necessarily detrimental to egg production, for in all three provinces, high production has been obtained. Last year Indian Head, with 105 pullets gave an average of 183.7 eggs, the highest being 292 eggs. At Lethbridge,

Alta., the average production has been between two or three times the average of the census returns for 1911.

The province giving the highest production is British Columbia. At the Agassiz Farm seventy miles east of Vancouver, 200 egg hens are quite common, 250 and 270 by no means rare, and at our Vancouver Island Station, a White Wyandotte flock of 200 pullets gave an average of 195.97, 29 of which were about 175 eggs, 82 above 200. There we have reached the high production of 300 eggs a year, for one pullet. At that station no bird is considered worth keeping for breeding if she does not lay 200 eggs the first year, and no cockerel is retained unless his mother laid 250 eggs in her pullet year.

This production need not necessarily be peculiar to Experimental Farms. The average farm is so situated that if it followed pedigree breeding, or even used pedigree males of high producing strains, it should give as good or better production than the Experimental Farms because of the public nature of the latter. High class breeding stock and eggs from our various Farms are available to the public and the public is certainly taking advantage of this opportunity, for the demand for pedigree cockerels is far beyond the supply, and there is no question but that the assistance given by the Farms, and other breeders of high producing strains, will mean much during the next few years in the establishing of higher laying strains throughout the Dominion. It is through the males that increased production is secured and the distribution of bred-to-lay cockerels means a general increase in production.

THE FINCH DAIRY STATION

A Demonstration Plant Combining the Manufacture of Cheese and Butter and the Shipping of Milk and Cream

BY J. A. RUDDICK, DAIRY COMMISSIONER, OTTAWA

PRODUCERS should not in these days be placed in a position of dependence on any single outlet for the disposal of their milk. The ideal arrangement, wherever it is possible, would be to have a receiving depot, preferably under the control of the producers, equipped to manufacture cheese and butter, and in large establishments possibly condensed milk or milk powder, and for the sale of milk or cream. The idea has been tried out at the Finch Dairy Station, operated by the Dominion Dairy Branch, with what success I will leave it with you to judge.

The Station was started in 1912. It is located at the crossing of the Ottawa branch of the New York Central Railway and the Montreal-Toronto line of the C.P.R. The train service is such that the morning's milk or cream can

be delivered by noon in either Montreal or Ottawa. The Station is equipped for the manufacture of butter or cheese and for the shipping of milk or cream, pasteurized or not as may be required, but in either case well cooled. Cheese factories surround the Station on all sides and there is a condensory at Chesterville 10 miles away. That the patrons have been satisfied with the returns is indicated by the fact that the quantity of milk received annually has increased from 2,069,281 pounds in 1912 to 5,570,545 pounds in 1920. I have been informed that not a single individual milk or cream shipment leaves the Finch railway station, although it is well within the area from which supplies are drawn for Montreal and Ottawa.

The following table gives the record for the nine years of operation:—

TABLE 1.

Year	No. of Patrons.	Milk Received.	Net Return to Patrons	Total Amount Distributed to Patrons.
			per 100 lbs.	
		Lbs.	\$ cts.	\$ cts.
1912.. . . .	60	2,069,281	1 11	23,304 49
1913.. . . .	60	2,720,028	1 04	28,214 73
1914.. . . .	64	2,356,202	1 19	28,108 74
1915.. . . .	65	2,418,010	1 35	32,640 85
1916.. . . .	54	2,486,380	1 60	39,779 88
1917.. . . .	65	2,807,885	2 00	56,173 46
1918.. . . .	75	3,859,217	2 14	82,785 69
1919.. . . .	100	5,480,816	2 49	136,540 56
1920.. . . .	112	5,570,545	2 49	138,792 89
		29,768,364		\$566,341 29

It will be noticed that there has been an increase in the number of patrons, especially during the last two years, but these are mostly winter patrons who come in for a few weeks after surrounding factories close. We have not en-

couraged patrons to leave competing factories during the summer months.

The record for 1920 showing the disposal of the milk and rate per 100 paid to patrons month by month may be of interest and help to bring out my point. Here it is:—

THE AGRICULTURAL GAZETTE OF CANADA

Disposal of milk and returns to Patrons by months, Finch Dairy Station, 1920.

TABLE II.

Month.	Cheese lb.	Butter lb.	Milk sold lb.	Fat sold as cream lb.	Return to patrons per 100 pounds.
January.. . . .	.....	.....	153,216	.....	\$3 50
February.. . . .	.....	.....	107,288	1,272	3 22
March.. . . .	.....	.....	94,911	7,316	2 70
April.. . . .	.....	3,441	.....	13,751	2 37
May.. . . .	12,322	483	.....	20,399	2 49
June.. . . .	2,395	.....	.....	30,933	2 38
July.. . . .	33,950	768	.....	13,822	2 24
August.. . . .	15,703	4,736	32,240	9,540	2 28
September.. . . .	5,591	9,258	.....	9,367	2 45
October.. . . .	3,846	1,765	20,000	11,985	2 63
November.. . . .	.....	.....	31,120	10,040	2 72
December.. . . .	.....	.....	.....	8,778	2 70
Totals.. . . .	73,807	20,451	438,725	137,203	....
Average for year.. . . .	.....	.....	.....	.....	2 49
Total milk received.. . . .	.....	.....	5,570,545	.....	.....

In case it may be thought that the patrons of the Finch Station have some special advantages in low manufacturing charges or other bonus let me say that they have none whatever. They get a good service for which they pay full rates. It is a strictly commercial proposition, and any advantage there is in it comes through good business management and being in a position always to sell the product for which there is the best market at the time.

The charges for manufacturing are 2½ cents per pound for cheese and 5 cents for butter; for handling milk 12 cents per hundred pounds is charged and for cream 4 cents per pound of fat.

In operating the station the management makes no lengthy contracts. Prices are determined week by week. The quantity of milk or cream shipped is varied or shipments stopped entirely at a day's notice. Milk distributors can afford to pay and do pay a premium for milk under an arrangement of this kind because they avoid surpluses, on which there is always a loss.

I do not offer this plan as a solution for all the producers' difficulties, or as one suitable for general adoption. I am aware that there are many localities to which it would not be adaptable. I see no reason, however, why it could not be followed in many places where there are good shipping facilities or where milk could be sold to condenseries

or powder factories. The condensor at Chesterville has been a good customer of the Finch Station. It is along similar lines that the Fraser Valley (B.C.) Milk Producers are working, and I believe that organization is the most successful of all similar organizations in Canada.

If a number of establishments like the Finch Station were in operation in Western Ontario they would undoubtedly have a steadying influence on the milk situation as a whole.

It is admitted that the most serious aspect of the milk situation in Ontario, which developed when the demand for condensed products fell off last fall, was the closing of the old cheese factories, with their equipment scrapped, even the buildings gone in some instances, the staffs of experienced makers dispersed, and the organization completely broken up.

If I were planning such an establishment, I would make the manufacture of cheese or butter the sheet anchor of the business, and then sell as much milk or cream as I could find a market for at higher prices.

We need never be afraid of serious over-production of either cheese or butter. The market for all we are likely to make is waiting for us, and in the case of cheese at any rate we can command the very top price in the world's markets.

THE VALUE OF INSECTIVOROUS BIRDS TO AGRICULTURE

BY ARTHUR GIBSON, DOMINION ENTOMOLOGIST

THE entomologist in his studies of insects destructive to crops, is frequently amazed at the numbers of insects which are devoured by many of our native birds, particularly during the nesting season. Some birds, as for instance the Chickadee, feed upon insects throughout the year, the insects constituting as high as 95 per cent of their food. The United States Biological Survey have, for many years, devoted much attention to the feeding habits of birds and in the investigations conducted thousands of bird stomachs have been examined. Little of such work, comparatively, has as yet been accomplished in Canada.

The annual loss in Canada to field, orchard and garden crops, due to destructive insects, is on a conservative estimate, upwards of \$200,000,000. To this huge devastation must be added the enormous annual destruction caused by forest insects, stored product insects, etc. It is certain that these losses would be very much greater if it were not for our insectivorous birds.

Mr. Norman Criddle, Entomologist, in charge of the Entomological Laboratory at Treesbank, Manitoba, has for a number of years made special observations on the feeding habits of certain birds, chiefly in the vicinity of his home near Treesbank. One or two of his most striking statements are worthy of mentioning here. He records that in June, 1918, the food of one brood of young prairie horned-larks consisted largely of cutworms which the parent birds searched for in the soil. It was estimated that 400 cutworms were consumed in one day, and such feeding would probably continue for a period of 10 or 12 days. When it is realized that the horned-larks are among the most abundant of our western ground

birds, these figures cannot fail to impress one of the value of these birds in devouring enormous numbers of insects. C. W. Nash, of Toronto, records the robin as an active cutworm destroyer. One young robin kept in confinement ate 165 cutworms in a day. Had it not been confined, the probability is it would not have found so many cutworms, but the experiment indicates the quantity of insect food required for the proper growth of such young birds.

During the past few years grasshoppers have caused important losses in grain-growing districts in Western Canada. Birds have been observed to devour large numbers of young hoppers. Mr. Criddle has informed me that crows, grouse and gulls were particularly useful. Regarding the crow the economic status of which has been questioned, evidence certainly proves that the food of this bird consists very largely of insects during the breeding season. According to Mr. Criddle, a family of six crows are capable of consuming three bushels of grasshoppers in one season, which quantity would approximate 1,242,000 individuals. Imagine the capability of large flocks of these birds! In certain places in Manitoba areas of growing grain have been actually saved from destruction by grasshoppers, owing to the presence of large flocks of gulls which fed actively upon the insects.

In British Columbia in certain sections birds have been of undoubted aid in controlling the Spruce Budworm, a destructive pest of balsam and spruce trees. Messrs. J. D. Tothill and A. B. Baird, of the Entomological Branch, have noted in this connection, the Red-breasted Nuthatch, the Western Tanager, the Myrtle Warbler, the Chickadee, as well as a number of other birds. While our insectivorous birds reduce to

an important degree outbreaks of injurious insects, they are not unfortunately able to distinguish between the destructive and the useful kinds of insects and undoubtedly large numbers of the latter are freely eaten. It is, therefore, not always easy to accurately determine the exact economic status of many of our birds.

The value of protecting our useful birds is every year becoming more widely recognized by farmers, fruit-growers and others. Not only do they aid us in destroying enormous numbers of injurious insects, but many of them feed largely upon seeds of weeds. The various sparrows, for instance, are typical weed seed eaters. In the state of Iowa, it has been estimated that tree sparrows annually eat approximately 875 tons of weed seeds. As the late Dr. C. Gordon Hewitt pointed out, however, "the weed destroying power of graminivorous birds may be exaggerated if the question is

not investigated with great thoroughness, for while the powerful gizzards of some birds may grind up the hardest coated seeds, in other cases seeds may be capable of germination after passing through the digestive tract, as Collinge has shown in a number of cases in English birds."

The protection of migratory birds by the passing of the Migratory Birds Convention Act has in the United States, resulted in a total return in actual food value to hunters of more than \$20,000,000. The passage and enforcement of the above Act has also been of great service to Canada, but as far as the writer knows there are no figures comparable to the above.

Not only do our wild birds assist us very materially in our fight against injurious insects, but they also charm us with their delightful appearance and their ever pleasing songs. It is the duty of all citizens to aid at all times in their protection.

COMBINED SEED CROP AND CLEANED SEED COMPETITIONS

BY GRANT S. PEART, CHIEF, MARKETS DIVISION, SEED BRANCH

ONE phase of the work of the Seed Branch is to promote greater production of good seed in Canada. This is being done through three chief channels; first, by supporting the Canadian Seed Growers' Association in its work of producing registered seed; second, through providing a service of markets intelligence to growers and, third, by payment of cash subventions to the Departments of Agriculture of each of the provinces to encourage seed production. The money paid the provinces is used to pay prizes awarded in Standing Field Crop Competitions, Seed Fairs, Provincial Seed Exhibitions, and Combined Seed Crop and Cleaned Seed Competitions. Most Canadians who are interested in the

seed question will be already thoroughly acquainted with these competitions, with the exception of the last one named, the Combined Seed Crop and Cleaned Seed Competition. This competition is of recent introduction to the Seed Branch subvention agreement with the provinces, and it is my purpose here to give a brief outline concerning its form, purpose and application.

In form it has two distinct phases. The first consists of a Standing Field Crop Competition, and, in the second phase, a Threshed and Cleaned Seed Competition is held in which the seed produced from the fields of the first phase is judged in the granaries of the

competitors, after threshing is completed. The cash prizes awarded depend on the combined scores of both phases and awards are based 65% on the bin score and 35% on the field score. The cleaned seed part of these competitions is recognized, therefore, as the more important. This feature applies to all seed crops used, with the exception of potatoes, in which case the basis of making awards is reversed, namely, 35% on the bin score and 65% on the field score. These competitions must have at least fifteen entries in each and the foundation seed used by competitors must be of approved origin, which is registered seed or seed approved by the seed committee of the province in which the competition is organized. The minimum quantities of cleaned seed ready for market, which competitors must be prepared to submit to the judges in order to qualify for awards, are as follows:—

Wheat.....	150 bushels.
Barley.....	100 "
Oats.....	200 "
Peas.....	100 "
Buckwheat.....	100 "
Corn.....	100 "
Field beans.....	25 "
Clovers and Timothy.....	15 "
Potatoes.....	150 "

According to the Seed Branch agreement with the provinces, all agricultural associations (not necessarily Agricultural Societies) are eligible to conduct these competitions, provided that during the same season the agricultural association does not conduct a Field Crop Competition with the same kind of crop. The amount of money available for prizes in each competition by virtue of the subvention agreement, is \$200, which needs to be supplemented by the province with an additional \$100. When the total amount available is not awarded, the amount of the subvention paid is two-thirds of the cash prizes awarded in the competition, the province paying the other one-third.

The primary purpose of the Combined Seed Crop and Cleaned Seed Competition is to encourage the development of commercial seed centres, as are being promoted by the Canadian Seed Growers' Association and other seed growers' associations of the country. The demand for superior quality seed of recognized breeding has grown very materially during the past few years, until the normal supply has been more than overtaken by the demand. Particularly is this the case in the matter of seed grain in car-lot quantities. This demand comes, for the most part, from the seed trade and farmers' organizations, which, because superior seed grain in car-lots has not been available, have resorted to seed supply of unknown breeding and indifferent quality in order to supply the country's needs. The commercial seed centre would be expected to supply these needs with registered seed grain. It may be well to point out that the Field Crop Competitions were not designed to serve the foregoing purpose, but they have paved the way for the application of the Combined Seed Crop and Cleaned Seed Competitions and the development of seed centres, because they have clearly indicated those sections in each of the provinces where commercial seed centres might be established, founded on economic principles of seed production and marketing; in other words, that seed growing would be a profitable enterprise in certain districts. This information naturally is essential in promoting the production of special kinds of seed in different localities, for the foundation of the seed centre idea is whether seed production in a given district would be profitable to the growers and worthy of development.

Those districts in which agricultural associations elect to conduct this form of competition will need to be especially adapted to the production of seed of the kind of crop that is used in the competition and the crop must be a general one throughout the district,

otherwise difficulty will be experienced in procuring sufficient entries and complying with the quantities of cleaned seed required by the regulations.

It is expected that the Field Crop Competitions will be continued in most localities of the country and serve their purpose of creating local seed supply, but that special districts, suitable for seed centre development, will take up the other form of competition.

The principle of the Combined Seed Crop and Cleaned Seed Competition was first conceived in the Province of Quebec and put into effect there for the first time in 1918. By 1920 its value had been proved and as a result, these competitions were organized in thirteen different counties of the province. The chief crop used was oats and a good deal of the seed produced is eligible for registration. The judging in the bin is now being done, under the direction of the Seed Branch representative for Quebec and indications are that a

number of carloads of excellent seed oats will be made available to the trade through these competitions, which have created centres of seed supply. Also last season there were two competitions organized in Nova Scotia, three in Prince Edward Island and one in New Brunswick, but, owing to unsatisfactory weather conditions, the crops were comparatively poor, with the exception of potatoes, which was the crop used in New Brunswick, and from which some excellent stock of certified seed is now available.

These competitions are, therefore, being taken up in a way that shows that their value is appreciated by the farmers who entered them. Another season, we are practically assured, they will be given a trial in the other provinces. A great deal is expected from them and they should become staple institutions in all the provinces and serve a long felt need of encouraging the production of seed supply for commerce.

CANADIAN EGG-LAYING CONTESTS

BY F. C. ELFORD, DOMINION POULTRY HUSBANDMAN, OTTAWA

EGG-Laying Contests in Canada have become a definite factor in one of the newest and greatest developments that up to the present has affected Canadian poultry keeping. These contests are the medium through which certificates of Record of Performance for poultry are obtained, and it is expected that before long registration will be established for those birds qualifying in Record of Performance through the contests.

Laying Contests as spectacular events are by no means new in the poultry world. They have been found valuable in emphasizing the importance of production and in stimulating the breeding and development of better laying stock; but Canada was the first country to

standardize contests as a national medium for obtaining official records of performance. Nor are isolated Egg-Laying Contests, as contests, new in Canada, for the Department of Agriculture of British Columbia and the Department of Agriculture of Alberta each conducted a contest for several years, the former at Exhibition Park, Victoria, and the latter at University Grounds, Edmonton; but it was not until November, 1919, that the contests emerged from individualism and assumed a national character with a definite mission.

One year prior to that date a commencement was made at the Experimental Station, Charlottetown, Prince Edward Island, when a contest of twenty pens was operated for eleven months.

This was in the way of an experiment and was partially in response to a desire from the breeders of Prince Edward Island for something that would concentrate attention upon production and to help demonstrate the importance of the poultry industry on the Island. During the operation of the Prince Edward Island contest, the Dominion Experimental Farms Branch made ready to start contests at several of its farms and stations throughout the Dominion, and, as already noted, on November 1, 1919, the first series of standardized Egg-Laying Contests was inaugurated under practically the same rules and regulations. These contests were located as follows:—

Canadian Egg-Laying Contest, Central Experimental Farm, Ottawa;

Prince Edward Island Egg-Laying Contest, Experimental Station, Charlottetown;

Nova Scotia Federal Egg-Laying Contest, Experimental Farm, Nappan;

Quebec Egg-Laying Contest, Experimental Station, Cap Rouge;

Manitoba Egg-Laying Contest, Experimental Farm, Brandon;

Saskatchewan Egg-Laying Contest, Experimental Farm, Indian Head;

Alberta Egg-Laying Contest, Experimental Station, Lethbridge.

The rules and regulations approved by the Executive of the Canadian National Poultry Association, covering the first year's contests were briefly, that ten birds were allowed to a pen, and that each contestant might substitute up to two birds. The contest lasted for fifty-two weeks, from November 1 to October 29, but in order to secure Record of Performance—which it should be remembered is really the main object of the contest—each bird was allowed to complete her fifty-two weeks of laying; that is, her record did not finish until

52 weeks from the time her first egg was laid, providing she finished her record by December 31, which was the time limit set for all birds. The number of eggs required to qualify for "Record of Performance" is 150 eggs in 52 consecutive weeks. There is also an "Advanced Record of Performance" qualification for which 225 eggs are necessary. These eggs must average 24 ounces to the dozen, and the bird must be pure bred, typical of the breed, and free from standard disqualifications.

The Egg-Laying contests are now in their second year. The number has grown until each province is represented by a contest, and, in addition to these, there is also the Canadian Egg-Laying Contest at Ottawa.

The following is a list of the contests at present in operation, and the number of pens:—

	No Pens.
<i>Canadian Egg-Laying Contest</i> , Central Experimental Farm, Ottawa	50
<i>Ontario Egg-Laying Contest</i> , Central Experimental Farm, Ottawa	24
<i>Prince Edward Island Egg-Laying Contest</i> , Dominion Experimental Station, Charlottetown	25
<i>New Brunswick Egg-Laying Contest</i> , Dominion Experimental Station, Fredericton	21
<i>Nova Scotia Federal Egg-Laying Contest</i> , Dominion Experimental Farm, Nappan	22
<i>Quebec Egg-Laying Contest</i> , Dominion Experimental Station, Cap Rouge . .	24
<i>Manitoba Egg-Laying Contest</i> , Dominion Experimental Farm, Brandon . .	24
<i>Saskatchewan Egg-Laying Contest</i> , Experimental Farm, Indian Head . . .	20
<i>Alberta Egg-Laying Contest</i> , Dominion Experimental Station, Lethbridge . .	22
<i>British Columbia Egg-Laying Contest</i> , Dominion Experimental Farm, Agassiz	27

Slight changes were made in the standardized rules for 1920. Among these, the two most important are that the owner is permitted to keep his pen up to full strength and to mate his birds while in the contest.

At the time of writing full arrangements for the registration of birds are not complete, but it is expected that the registration of all birds that qualify in the Record of Performance through egg-laying contests will be registered. This will prove the biggest forward step in poultry work that any country has

yet attempted, not only will it do away with spurious and misleading advertising of production, but it will establish authentic records of pedigree breeding which will form the basis for future growth and confidence such as nothing else has been able to do.

THE PRUNING OF FRUIT TREES

Modern Methods at Variance with Former Practices

BY M. B. DAVIS, ASSISTANT IN POMOLOGY, CENTRAL EXPERIMENTAL FARM

HORTICULTURAL science is to-day making rapid strides in the solution of problems upon which light has long been wanting. Scientific research is unearthing a wealth of material, much of which offers practical solutions or at least suggestions for some of the difficulties in profitable orchard management.

Pruning practices to-day are radically different from those of the past, and the new recommendations are based on experimental results.

Not many years ago, it was a common practice in the care of the young orchard to head or cut back annually, regardless of the condition of the tree. In fact, this principle in a more or less modified manner was extended to older trees in bearing.

While for the first few years of a tree's life heading back is necessary, especially with varieties tending to produce long growths, with few laterals, the indiscriminate heading back or butchering of trees must be guarded against.

At the Vineland, Ontario, Experimental Station unpruned trees have yielded slightly better than trees pruned. But trees pruned lightly in late summer have yielded almost as well as the unpruned, and have the added advantage of being in better shape for future performance. In fact, the unpruned trees if left indefinitely will reach a condition

where drastic treatment will be necessary to relieve the congestion and to renew the fruiting surface of the tree.

At Ottawa, on young trees, we have found that no pruning has given as good total growth as either spring or summer heading back, accompanied by a larger girth measurement. Where severe heading back was practised, the girth measurement was much less than in the unpruned plots and the trees presented a less vigorous appearance. Where light heading back for the first three years was adopted, the comparison between trees pruned and unpruned showed little difference in favour of the unpruned, but those trees that had been pruned were of decidedly better shape and in better condition for future work than the ones where pruning had been neglected.

These results have simply justified the practice at Ottawa for years past, viz., to prune during the first few years of a tree's life with the express purpose of obtaining a desirable amount of growth placed where it is wanted.

In the case of some trees the growth will require considerable cutting out and some cutting back for the first three or four years. In other cases, it will require very little wood removal, but in all cases the trees should be attended to annually.

Although in the light of modern research we would say, "prune only as much as is necessary to produce a tree of desired type and form," we would caution against swinging from severe pruning to absolutely no pruning for a considerable period, the sequel of which would ultimately be a rather too severe heading back and cutting out to correct past neglect with a possible consequent upset in the balance between nitrogen and carbohydrates. In short, more or

less severe heading back and thinning out during the first four years after planting may be necessary to mould the form of the tree and may be practised without loss of vigor. After that, severe annual pruning should be discontinued and trees that are bearing annually should receive light annual pruning, sufficient only to maintain symmetry, to prevent too long or rangy growth and to prevent the establishment of long limbs with growth only at the tips.

FIBRE FLAX DESEEDING MACHINE

Its Importance in the Development of a Flax Fibre Industry in Western Canada

BY R. J. HUTCHINSON, CHIEF OF FIBRE DIVISION, DOMINION EXPERIMENTAL FARMS

LATE in the year 1918, when the Honourable T. A. Crerar was Minister of Agriculture, the Department instituted through the Central Experimental Farms, an extensive series of investigations and experiments as to the possibilities of utilizing commercially the fibre contained in Linseed Flax so extensively cultivated in the Prairie Provinces.

These experiments were continued well into the year 1920, and resulted in the production of a large range of useful and necessary articles such as insulating felts, twines, cordages, binder twine, yarns for sacking, canvas, burlaps, floor covering, etc, for which there was an immense market.

All of these articles, with the exception of the insulating felt came under the heading of textiles. That is, that the fibre had to be in such a state and condition that it could be drawn and spun, and it was found that to do this, the fibre had to have an average length of about six inches.

It was clearly demonstrated that the fibre in flax straw which had passed through the ordinary toothed cylinder thrasher and blower was of no textile

value, it being so broken that it would not spin.

In preparing the fibre of flax for pure linen purposes, the greatest care has to be taken that the straw is in no way damaged during the operations of harvesting and thrashing, so that the fibre when recovered would retain its full line or length and be valuable as a raw material in spinning. The old methods of harvesting and thrashing the flax, which was cultivated for its linen fibre, was first pulled by hand, and, second, thrashed by hand; both tedious and expensive operations.

It was at once evident that if the fibre of Western Linseed Flax was to become a profitable commercial raw material, then some means other than hand labour must be found for harvesting and thrashing the flax without damaging the straw, and the full length of fibre that it contained. There would be no objection to the Western Flax being cut by binder, instead of being pulled, for a good average crop would be at least 18 inches in length and if the stubble were but three or four inches, the length of straw remaining would be over and above what was absolutely necessary to give the textile length of fibre when recovered.

Test of Deseeding Machine

The past season has witnessed two important developments in harvesting machinery in the Ontario fibre flax fields, namely:—

1. The mechanical flax pulling machine.

2. The fibre flax deseeding and cleaning machine.

The flax pulling machine not having its place as yet in any possible western development of the flax industry, may here be left out of further consideration, but the flax deseeding machine will be apparently called upon to play an important role in the development in any industry that has for its object the utilization of Western Linseed Flax Fibre.

On the 6th day of January, this year, I assisted at a demonstration of the Van Allen Flax Deseeding and Cleaning Machine (invented and constructed by Mr. F. L. Van Allen), which was then deseeding a crop of good ordinary fibre flax on the premises of Mr. Tipling at Ripley, Ontario.

A special trial for capacity was carried out on a steady run of four hours. The average weight of straw passed through the machine was equivalent to two tons per hour.

I made a thorough examination of the materials after delivery by the machine during the test run and found that the seed bolls had been thoroughly separated from the straw; the straw was in no way damaged and was delivered from the machine in a perfect sheaf, well tied and well butted; the chaff and seed were thoroughly freed from the straw; the seed delivered from the machine was exceptionally well cleaned and the chaff blown over contained no flax seed.

Such a machine would handle Western Flax Straw even more readily than the Eastern fibre flax straw, as the Eastern straw is more delicate in texture and consequently more susceptible to bruising and breaking.

From the official report published regarding the experiments carried out with Western straw, it was found that the average weight of straw per acre grown for linseed purposes, when cleaned of its seed and chaff, was about 1,200 pounds. A conservative estimate of the capacity of the new deseeding machine would be at least two Western acres of Linseed Flax per hour or 20 acres on 10 hours run. While this capacity does not equal or can it compete with the large thrashing outfits, there are several points, however, which should be taken into consideration.

1. As the whole flax plant has not to be torn apart in recovering the seed the motive power necessary for driving the machine is only five or six horse-power.

2. Work can be commenced earlier in the day and later in the evening than with the ordinary thrasher, as the dampness does not affect the seed bolls in the same proportion as it does the stalk of the plant, which is hygroscopic. I might say here that upon the day when I witnessed the performance of the new de-seeder, rain fell heavily and although the flax was under cover the seed bolls were quite damp, and despite these most unfavourable weather conditions, the machine was running steadily and doing most excellent work.

3. By this specialized machine, flax deseeding operations in the open field could be commenced without waiting until the general cereal crop had been thrashed and was out of the way, which is generally the conditions under which the Western Flax crop is thrashed.

4. A profit would result from the straw as well as from the seed.

I understand that it is the intention that several of these machines shall be put in operation this year in the West by private enterprise which is now being organized to take advantage of the information gathered and disseminated by this Department.

SPRAYING VERSUS DUSTING

Will Dusting give as Good Results in Pest Control as Liquid Spraying?

BY G. E. SANDERS, IN CHARGE OF INSECTICIDE INVESTIGATIONS, ENTOMOLOGICAL BRANCH

IT is generally conceded that two men and a team can prune, cultivate and fertilize more than 25 acres of orchard, but that they could not with one spray rig do full justice in spraying to more than twenty-five acres. The limiting factor of an economical unit is therefore the spray rig.

A dusting rig can easily take care of sixty acres in one season, and if dusting is equal in pest control to spraying, the change to dusting would have the effect of increasing the economical unit of apple orchards and probably make cultivating the limiting factor in determining the maximum area that one team, two men and equipment could care for, or the economical unit for apple production.

The reputation of dusting has in the past been the reputation of sulphur dust; it might be best to enumerate some of the advantages, questionable points and disadvantages of dusting.

Advantages of Dusting

The advantages of dusting that are generally appreciated are:—

1. *Greater speed in application.*

A dusting outfit is capable of treating from five to ten times as much orchard as a spraying outfit in a given time.

2. *More suitable timing of applications.*

Owing to the rapidity of application the grower can time his applications to better suit the weather and the stage of the fruit.

3. *Less waste time.*

Dusting operations should be done during weather unfit for most agricultural field operations, such as immediately following a rain or very early in the morning, while spraying operations require the best of weather.

4. *Lower cost of machinery.*

The initial cost of a dusting outfit is two-thirds that of a sprayer, the cost of upkeep is less, the gasoline used is less and the duster is a longer lived machine.

5. *Lighter weight of dusting apparatus.*

A dusting outfit with dust and operators on it does not weigh more than one-third the weight of a sprayer ready for operation, so it can be taken over hills and over wet ground where a sprayer would mire.

6. *Less liability to trouble and breakdown.*

A dusting outfit in practice is a reliable machine and is not responsible for delays due to leaky valves, blow-outs, etc., which frequently occur with high pressure sprayers.

7. *Simplicity and speed.*

This makes a greater appeal to the grower. More growers will dust than will spray, even if the total cost is the same, because it is less trouble. This is highly important, particularly in an orcharding community where it is desirable in the interests of every individual to improve the standard of product in the entire community. Of these advantages the first and last are probably the most important.

With the advantages of dusting enumerated, let us find out where there is doubt as to the value of dusting and the things that stand in the way of its universal adoption. The doubtful factors are:—

1. *Doubts as to the efficiency of dust in controlling*

- (a) Fungous disease;
- (b) Biting insects;
- (c) Sucking insects.

2. *Doubts as to the relative cost.*

In examining the data relative to the efficiency of dusting we find a great amount of experimental evidence available on 90-10 sulphur lead arsenate dust.

It is most curious to find that on averaging 30 experiments conducted in New York, Michigan, Illinois, and Nova Scotia, that the total average gives the following:—

SHOWING AVERAGES OF RESULTS REPORTED FROM NEW YORK, MICHIGAN, ILLINOIS AND NOVA SCOTIA.

Region	No. years	No. Exps.	Unsprayed			Sprayed			Dusted		
			Scab %	Worms %	Sound %	Scab %	Worms %	Sound %	Scab %	Worms %	Sound %
New York.....	4	11	43.2	22.0	14.3	11.4	7.8	65.9	12.2	5.0	70.0
Michigan.....	4	7	71.4	12.0	19.7	20.9	0.4	78.4	20.8	0.07	78.8
Illinois.....	4	7	70.4	44.7	11.8	19.1	8.8	60.1	19.9	8.5	58.6
Nova Scotia.....	4	5	51.4	6.6	41.9	12.4	3.7	83.1	12.4	2.9	83.7
Average of.....	16	30	56.5	21.4	22.2	15.6	5.2	71.5	15.6	4.0	74.4

TABLE No. 1—DUSTING EXPERIMENT 1920. PEST CONTROL. S. B. CHUTE'S ORCHARD, BERWICK.

Gravenstein

Plot No.	Material	Scab %	Bud Moth %	Fruit Worm %	Tussock %	G. A. Bug %	Side Worm %	Cod. %	J. Rust. %	Russet %	Count %
1 and 2	Spray calendar, liquid.....	29.7	3.4	1.9	0.8	0.25	0.8	0.02	0.5	3.9	4,000
3	Check.....	72.4	2.8	3.8	.4	.15	0.4	0.1	1.9	0.3	4,000
4	90-10 sul. dust.....	40.0	5.7	1.8	.1	.15	1.5	.04	.8	2.8	5,000
5	4-11 copper arsenic dust.....	24.2	5.8	1.8	.0	.2	.4	.06	.8	4.	7,000
6	1-24 (4-11 cop. ar. dust) 3 (90-10 sul. dust).....	19.5	10.1	2.5	.0	.0	.4	.02	1.	3.5	4,000
7	1-24 (4-11 cop. ar. dust) 3 (90-10 sul. dust).....	15.5	8.7	2.3	.16	.2	.7	.3	1.5	3.5	5,000
8	1-24 (5-11 cop. ar. dust) 3 (90-10 sul. dust).....	15.6	9.4	1.1	.1	.06	1.3	.2	1.2	14.1	3,000
9	1-24 (com. Bord. 4-11) 3 (90-10 sul. dust).....	20.2	6.	2.9	.1	.4	.3	.03	1.5	2.7	3,000
10	1-24 (mag. comm. Bord.) 3 (90-10 sul. dust).....	15.4	12.8	2.3	.1	16.	.4	.06	.2	2.1	3,000

THE AGRICULTURAL GAZETTE OF CANADA

The foregoing refers to 90-10 sulphur dust only. It is curious to find that the percentage of apple scab in the dusted and sprayed plots is exactly the same, while the dust is slightly superior in insect control and in total number of sound apples produced.

During the past three years we have been experimenting with a copper arsenic dust which was devised by the writer in

1918. This in the proportion of 4 per cent metallic copper and 1½ per cent metallic arsenic has proved in all tests superior as a fungicide to 90-10 sulphur lead arsenate. The count in pest control and the pack out resulting from various strengths of this dust in comparison with sulphur lead arsenate and liquid spray are given in the tables Nos. 1 and 2:—

TABLE No 2—DUSTING EXPERIMENT 1920. S. B. CHUTE'S ORCHARD, BERWICK, N.S.

Pack-out of Gravensteins in large plots.

Plot	Material	No. 1	No. 2	Domestic	No. 3	Culls
		%	%	%	%	%
1 and 2	Spray calendar, 4 sprays.....	48.5	16.6	14.7	18.	1.8
3	Check.....	19.2	9.5	36.2	32.2	2.7
4	1-2-3-4 90-10 sul. dust.....	34.	17.5	29.5	16.2	2.7
5	1-2-3-4 (4-1½ copper ar. dust.)	57.5	12.3	16.5	12.3	1.3
6	1-2-4 (4-1½ cop. ar. dust)					
	3 (90-10 sul. dust.).....	66.6	9.2	9.2	14.	1.3
7	1-2-4 (4½-1½ cop. ar. dust)					
	3 (90-10 sul. dust.).....	61.5	19.	8.1	10.8	0.5
8	1-2-4 (5-1½ cop. ar. dust)					
	3 (90-10 sul. dust.).....	66.4	10.6	14.6	7.9	0.4
9	1-2-4 (comm. Bord) 4-1½					
	3 (90-10 sul. dust.).....	45.2	4.1	23.3	24.6	2.7
10	1-2-4 (Mg. Bord) 4-1½					
	3 (90-10 sul. dust.).....	48.3	6.9	18.1	26.5	count missed

Relative Cost

It will be seen from the foregoing that we now have dusts that can be confidently recommended as equal to liquid spray, both in the control of fungous diseases and biting insects, and it should be mentioned here that the dust was not given what we would call a fair trial as it was applied on the same days as liquid spray was applied and no oftener, whereas the ideal manner of applying dust would be to apply it oftener than liquid spray, varying the intervals with weather conditions.

Last year it was explained that dusting with 90-10 sulphur lead arsenate dust cost more than liquid spraying. This still holds true. It was further stated that dusting with copper arsenic dust costs less than liquid spraying. This also holds for 1921 and will continue to hold.

We can now therefore say that dusting is cheaper than spraying. Dusting is equal to spraying in the control of fungous diseases and biting insects. Dusting is inferior to liquid spraying in the control of sucking insects such as *Psylla* and green apple bug.

AVAILABLE SUPPLY OF SEED POTATOES IN EASTERN CANADA

The Markets Division of the Seed Branch, Ottawa, has made a detailed survey of available supplies of certified seed potatoes for the coming spring trade. It was found that more than 300 growers, out of a total of 1,400 certified seed potato growers in eastern Canada, have seed available for sale outside of their immediate neighbourhoods. The location and quantity of this seed available to the spring trade is as follows, by provinces: Prince Edward Island, 9290 bags; Nova Scotia, 780 bags; New Brunswick, 31,855 bags; Quebec, 72,650 bags; Ontario, 2,797 bags; Manitoba, 2,362 bags.

The following varieties are available:—Green Mountain, Irish Cobbler, Gold Coin, Early Ohio, Rural New Yorker, Carman, American Wonder, Dooley, Dakota Red and other popular kinds. Purchases may be made in car lots or less quantity and the growers expect a small premium over current prices for

table stock of comparable quality. We believe it to be in the interests of Canadian agriculture that this large stock of certified seed potatoes be used for seeding in Canada this coming season. We are glad to receive inquiries from prospective purchasers, farmers and seedsmen, and are prepared to supply the names of growers who have for sale the varieties mentioned above.

Certified seed is the product of potato fields that have been inspected by trained pathologists under the direction of the Dominion Botanist. To be eligible for certification, the growing crop must pass the Department's inspection standard for freedom from diseases. These standards include also a clause calling for purity of variety. The seed potatoes from the fields that pass inspection are graded, sacked, sealed and marketed on the basis of the Department's certificate.

PROSPECTS FOR MARKETING SWEET CLOVER SEED

The crop of sweet clover seed in Ontario is estimated by the Seed Branch at one hundred per cent increase over 1919. This increase in production is the logical result of the heavy demand for the seed one year ago and the large money returns netted the growers. In 1919, the production of sweet clover seed in Ontario was estimated at 30,000 bushels sold to merchants, plus an unknown quantity that changed hands from the grower to the farmer direct. On this basis, there would be 60,000 bushels of the crop available within the province for the trade this season. This would be additional to the unknown quantity that may be expected to change hands direct.

There promises to be twice as much sweet clover seed in the province this season as last, and prospects of important exports of this seed to other countries are not bright. It may be assumed that there is 60,000 bushels available, which the trade is expected to absorb.

That there will be greater demand in the home market this coming season than ever before seems quite probable, particularly if farmers can buy the seed at a moderate price. A growing popularity of the crop is to be observed in Ontario and extending to other parts of Canada. Thousands of farmers during the past two years have come to believe in sweet clover as a general utility forage crop and one of the best nitrogen gathering crops. It will be

surprising if the natural demand for seed does not materially increase this year over last year; this in face of a plentiful supply of seed of other kinds of clovers at pre-war

prices. But unless there develops a phenomenal demand on the part of Canadian farmers during the next three months, there will likely be a heavy carry-over of unmarketed seed in Ontario.

THE GRADING AND INSPECTION OF EGG SHIPMENTS

LIVE STOCK BRANCH

Regulations under and by virtue of the Live Stock and Live Stock Products Act standardizing Canadian eggs and governing interprovincial and export shipments are administered by the Live Stock Commissioner. These regulations stipulate that eggs shall be candled and graded according to the Canadian standards. The candling of eggs is not a difficult process; it requires but little skill to tell at a glance before the light the difference between good and bad eggs, but it requires technical knowledge and experience to grade eggs for quality and edibility—in other words, to be able to judge the interior quality by candling. The grader must be thoroughly familiar with the structure of the egg, and the distinguishing characteristic of each kind of egg found in commercial work, before he is able to determine accurately the proper grade in which an egg belongs.

Eggs are graded for market according to quality, size, cleanliness, and soundness of shell. When a shipment is prepared for market according to legal

standards and prescribed regulations, a Government inspector is called upon to inspect the shipment, from which he takes a fully representative sample for examination. If the sample taken is found to be satisfactory, the Government mark of approval is placed upon each case, and a certificate is issued approving the shipment. This is inspection by approval and is given at the point of shipment and at the time of shipment. The principles underlying this form of inspection provide a safeguard for both buyer and seller, giving the buyer a guarantee of quality through the medium of the inspector's certificate as issued and the markings placed on the cases, and the seller protection, the whole work of inspection being done at the point of shipment and at the time of shipment. As a result of this standardization and Government inspection, a greater domestic and commercial appreciation of quality in eggs is being developed.

THE ONTARIO TOBACCO CROP

The Ontario tobacco crop of 1920 was the largest in the history of the province, according to the report of Mr. F. Charlan, Chief of the Tobacco Division of the Dominion Experimental Farms. The total production was 21,681,100 pounds, including all varieties, as against 17,000,000 pounds in 1919. White Bur-

ley aggregated 19,432,000 pounds and constituted the bulk of the crop. The area devoted to the crop was 20,114 acres, Essex and Kent contributing 92 per cent of the total. At the present time there is somewhat less than one million pounds of the 1919 crop still in the hands of the growers.

THE AGRICULTURAL GAZETTE OF CANADA

RESULTS OF THE SECOND PRINCE EDWARD ISLAND EGG LAYING CONTEST

THE following are the final awards in on October 29, 1920. The contest was the Second Prince Edward Island held at the Experimental Station, Charlottetown:—
Egg Laying Contest which closed

No. or value.	Awards
\$30.93½	1. To the pen showing the largest revenue over cost of feed, from the sale of eggs, in the year— Mrs. R. W. Bullpitt, Cardigan, P.E.I. 1 pen of White Leghorns, 5 pullets and 1 cockerel. \$30.00
\$24.53	2. To the pen showing the second largest revenue over cost of feed, from the sale of eggs, in the year— Mr. P. L. Campbell, New Glasgow Mills, P.E.I. 1 pen White Leghorns, 5 pullets and 1 cockerel. \$25.00
1525	3. To the pen laying the largest number of eggs in the year— Mrs. R. W. Bullpitt, Cardigan, P.E.I. Cash prize. \$20.00
1426	4. To the pen laying the second largest number of eggs in the year— Mr. F. C. LeLachuer, Murray Harbour, P.E.I. Cash prize. \$15.00
1424	5. To the pen laying the third largest number of eggs in the year— Mr. J. B. Millman, Kensington, P.E.I. Cash prize. \$10.00
1404	6. To the pen laying the fourth largest number of eggs in the year— Mr. H. L. Machon, Murray Harbour, P.E.I. Cash prize. \$5.00
Hen No. B. 188. 196	7. To the bird laying the largest number of eggs in the year— One silver cup, donated by the Caldwell Feed and Cereal Company, to be won twice out of three contests, and to remain at the Experimental Farm until finally won. Mrs. R. W. Bullpitt, Cardigan, P.E.I. Value. \$50 00
Hen No. B. 175. 195	8. To the bird laying the second largest number of eggs in the year— Mr. F. C. LeLachuer, Murray Harbour, P.E.I. Cash prize. \$10.00
Hen No. B. 129.	9. To the bird laying the third largest number of eggs in the year— Mr. Benj. Rodd, Brackley Point Rd., P.E.I. Cash prize. \$5.00
	10. To the pen laying the largest number of eggs each 4 weeks— Cash prize (four weekly) \$2.00
	1st period (pen) Mr. B. Rodd, Brackley Pt. Road, P.E.I.
	2nd " Mrs. R. W. Bullpitt, Cardigan, P.E.I.
	3rd " Mrs. R. W. Bullpitt, Cardigan, P.E.I.
	4th " Mrs. R. W. Bullpitt, Cardigan, P.E.I.
	5th " Mrs. R. W. Bullpitt, Cardigan, P.E.I.
	6th " Mr. R. G. Fuller, Amherst, N.S.
	7th " Mr. H. L. Machon, Murray Harbour, P.E.I.
	8th " Mr. H. L. Machon, Murray Harbour, P.E.I.
	9th " Mr. H. L. Machon, Murray Harbour, P.E.I.
	10th " Mr. J. B. Millman, Kensington, P.E.I.
	11th " Mr. J. B. Millman, Kensington, P.E.I.
	12th " Mr. James Cain, Cardigan, P.E.I.
	13th " Mr. H. L. Machon, Murray Harbour, P.E.I.

THE AGRICULTURAL GAZETTE OF CANADA

No. or value.	Awards.
11. To the hen laying the largest number of eggs each 4 weeks—	
Cash prize (four weekly)	\$1.00
1st period (pen) Mr. H. L. Warren, St. Lambert, Que.	
2nd " Mr. R. C. Hamilton, Inverness, N.S.	
3rd " Mr. J. R. McMullen, Truro, N.S.	
4th " Mr. H. L. Warren, St. Lambert, Que.	
5th " Mr. H. C. Fraser, Montague, P.E.I.	
6th " Mr. H. L. Machon, Murray Harbour, P.E.I.	
7th " Mr. Bert Horsfall, St. Lambert, Que.	
8th " Mr. H. L. Machon, Murray Harbour, P.E.I.	
9th " Mr. E. Howatt, French River, P.E.I.	
10th " Mrs. R. G. McLaren, New Perth, P.E.I.	
11th " Mr. Benj. Rodd, Brackley Point Rd., P.E.I.	
12th " Mr. James Cain, Cardigan, P.E.I.	
13th " Mr. Mont. Annear, Montague, P.E.I.	
3008.73 ozs. 12. To the pen laying the largest weight of eggs in the year—	
Mrs. R. W. Bullpitt, Cardigan, P.E.I.	
1 White Leghorn pedigree cockerel	\$10.00
108 13. To the pen laying the largest number of eggs before New Years—	
Mr. Benj. Rodd, Brackley Point Road, P.E.I.	
1 Barred Rock pedigree cockerel	\$10.00
515 14. To the pen laying the largest number of eggs during the first five months—	
Mrs. R. W. Bullpitt, Cardigan, P.E.I.	
1 White Leghorn pedigree cockerel	\$10.00
(2) (11 to Dec. 31). 15. To the pen having the largest number of birds qualify for Record of Performance (150 two-oz. eggs).	
Mr. H. L. Machon, Murray Harbour, P.E.I.	
1 Barred Rock pedigree cockerel	\$10.00



PART II

Provincial Government Departments

THE SPECIAL SCHOOLS OF AGRICULTURE

A New Type of School Being Developed to Equip Students for Practical and Successful Farm Life

THE SCHOOL OF AGRICULTURE AT KEMPTVILLE, ONTARIO

THE Kemptville Agricultural School is situated within half a mile of the village of that name in Eastern Ontario. The decision to establish the school was arrived at in 1916. It is the outcome of an effort on the part of the provincial agricultural authorities to provide instruction in the essentials of successful farming and home making or household science for the young men and women from the farm who reside in that portion of the province. While not an agricultural college in the acceptance of the term, it is second only to the Guelph and Macdonald colleges in that section of Canada as an institution for specialized education in agriculture. At the Guelph and Macdonald colleges both the theoretical and practical sides of agriculture are taught, whereas, at Kemptville, the instruction given is intended to equip for farming as a vocation. The formal opening of the school took place on the 18th of February at the expiration of the present season's short courses, and this date may be said to be the real beginning of a school that will no doubt have a far-reaching influence on the agriculture of the district in which it is located.

Splendid Buildings

The buildings of the school are commodious and attractive. The new main building is a three-story brick structure of good design and modern to the last detail. It is 120 by 61 feet, ventilated, fireproof, with offices, reading rooms, laboratories, class rooms, cooking rooms, etc. In addition, there are the judging pavilion and gymnasium, the agricultural engineering building, the poultry plant, with all the barns and out-buildings necessary for a complete farm. Any one who is fifteen years of age and has had a public school training may enter the school, and there are no tuition fees. Students residing in school are charged \$5 a week for room and board.

Practical Courses

The school offers two courses. One is the regular two-year course which aims to give practical farming instruction in all branches of the subject. It lasts from October to April each year. It includes, in addition to all the knowledge needed directly on the farm, woodworking, principles of breeding,

THE AGRICULTURAL GAZETTE OF CANADA

stock judging, keeping of records, soil management, gas engines and farm tractors, forge work and horse shoeing, concrete work, harness repair, drainage, landscape gardening, forestry, English, public speaking, and special courses for teachers.

The short course consists of a few weeks of intensive study on the main branches of farm work. It is divided into three branches: general agriculture, farm power, and household science, the latter being the course for girls and

that more farmers fail from lack of knowledge of production costs than from any other cause.

The Farm and its Objects

The purposes of the farm connected with the school, as emphasized by the Principal, are, first, to furnish feed for live stock; second, to supply first generation, registered seed for the district. "There was not another farm in Eastern Canada last year that supplied as much



THE MAIN BUILDING, KEMPTVILLE AGRICULTURAL SCHOOL

women. To-day there are 26 taking the regular course and 78 the short course. It has been found that many pupils who take the short course get a taste for knowledge and come back next year, entering themselves for the two years of study.

The courses are intensely practical. Unlike some schools, Kemptville does not insist on more than a working knowledge of chemistry, soil bacteriology, and milk bacteriology. Book-keeping for the farm is insisted on. The boys are taught that good business methods pay, and

of this seed as we did, and every bit we had was sold," says Mr. Bell. "Moreover, we sold this seed to the farmers at reasonable prices; that is, instead of feeding it to the stock we sell it for enough to purchase other feed for our stock. Our third object is to demonstrate the utility of short rotations of crops. One thing badly needed in Ontario is to stop the destructive practice of sowing, say, oats, year after year, on the same land."

Fruit growing is also being taken up. Last year a 12-acre orchard was started. Another thing which the casual passer-

by will notice in future years is that along the highway between Kemptville and Bedell fine shade trees have been planted by the school. These are small as yet, but in a comparatively few years they will make a magnificent avenue along the Ottawa-Prescott highway, on which the institution faces.

While pupils do not work the farm, they are obliged to take part in the care and management of the live stock. On the farm are Holstein and Ayrshire

Community Service

One thing that Principal Bell insists upon is that the staff of the school shall be of use to the community during the time the harvest is on and the school is not in session. They are then required to give special assistance to the agricultural representatives of adjacent counties, and to keep in close touch with the farming industry of Eastern Ontario. "It is necessary for the staff to keep in close touch with the farmers,"



THE FIRST STUDENTS TO TAKE THE REGULAR COURSE AT KEMPTVILLE

cattle, Yorkshire hogs, Shropshire sheep, and Clydesdale horses. All the barns are new and equipped in modern style. Pupils are trained to figure out new undertakings. For example, last fall pupils were told to get out a 100 poultry run. They were furnished the blue prints, and from them they worked out the quantities, ordered the material, and did the work. From this, in a few months, will spring a poultry industry of no mean magnitude.

he stated, "in order that our work shall not become too academic."

In Professor W. J. Bell, B.S.A., the school has a principal whose personality is likely to prove a valuable asset to the institution. Realizing that many farm boys are deficient in mathematics and English, he has instituted an extremely practical course in those subjects. The farmer of to-day should be able to express himself, and he therefore insists that the students practise speaking in

THE AGRICULTURAL GAZETTE OF CANADA

public in order that they may develop qualifications for the best type of rural citizenship.

With Professor Bell are associated E. K. Hampson, B.S.A., who deals with field husbandry, chemistry, bacteriology and soil physics; James Childs, farmer; Peter McClelland, herdsman and dairy instructor; Dr. W. E. Baker, veterinary science; A. J. Logsdail, lecturer in horticulture, entomology, and botany; F. W. Brown, farm foreman; and Miss E. E. Weaver, secretary of the

school. L. G. Hermpel, B.S.A., instructor in agriculture, drainage and engineering, has just left the school, and his place has not yet been filled.

At present the school is somewhat hampered by lack of dormitory accommodation. It is one of the objects of the promoters that the school should be residential in character, and it was announced by the Deputy Minister of Agriculture, Mr. W. Bert Roadhouse, who represented the Ontario Minister at the opening, that plans had already been prepared for a residence and that it was hoped to complete the same by fall.

THE ALBERTA SCHOOLS OF AGRICULTURE

Three New Schools in Operation

BY HON. DUNCAN MARSHALL, MINISTER OF AGRICULTURE

DURING the summer of 1920 the construction of three new Schools of Agriculture in Alberta was completed. The schools are located at Raymond, Gleichen, and Youngstown, which together with the original schools built at Claresholm, Olds, and Vermilion, make in all six schools of Agriculture in the province. This gives Alberta the most comprehensive facilities for instruction in vocational agriculture of any province in Canada. In spite of a short crop, particularly in the vicinity of the Youngstown school, the attendance this year has been very largely increased.

Situated as it is in the centre of a large mixed farming district, the Olds school has always had the largest attendance, and the schools at Gleichen and Youngstown were built with a view to drawing from the attendance at Olds as well as serving a new territory. In spite of this fact, the enrolment at Olds this year was larger than in any previous year. The highest enrolment, until the present year, was 160, while the enrolment this year numbered 162. As

is always the case at institutions of this kind, for one reason or another, a number of students drop out. This year the low selling price of grain had a good deal to do with it. The attendance since Christmas has been slightly reduced, but there are in attendance at this school now 148 students, while at the new schools at Gleichen and Youngstown there are respectively 40 and 38 pupils, which is a good first year class and will easily be doubled next year. The school at Raymond has made a record for the first year, opening with 98 students. This large class is a striking testimony to the value of distributing the Schools of Agriculture in different parts of the province. In past years, ten or a dozen students from this district attended the Claresholm school, but the building of the school at Raymond, where the students would be within a convenient distance, has increased this number to the splendid attendance of almost 100. This has not materially reduced the number attending Claresholm, where the maximum in former years was about 100, and this year is an even 90. The

total attendance of pupils in agriculture at the schools and in the faculty of agriculture at the university numbers 510, which is something of a record in agricultural education in a province that contains the smallest population of any of the Canadian provinces outside of the three Maritime Provinces, and where a system of agricultural education has been so recently established. With anything like reasonably good years in agricultural production, there should be no difficulty in doubling this number in two years, and in recruiting from these

other useful and necessary work on prairie farms, is given special attention by skilled instructors. Dairying and poultry keeping are also given a very prominent place in the course of study, so that when students have taken the two-year course at these schools they have secured a comprehensive education in practical agriculture, as applied to the business of farming in Western Canada.

Agricultural education, however, is useful only to the boys who become pupils in an educational institution for the teaching of agriculture, and the

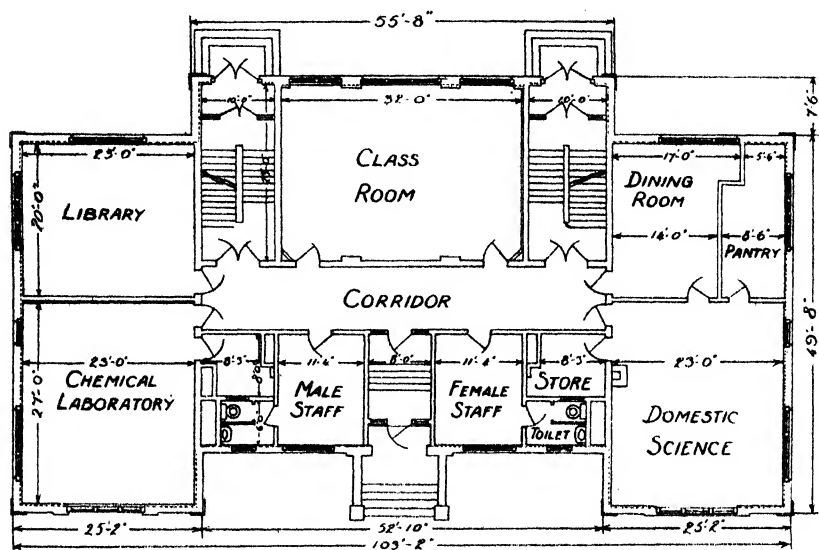


NEW AGRICULTURAL SCHOOL AT RAYMOND, ALBERTA

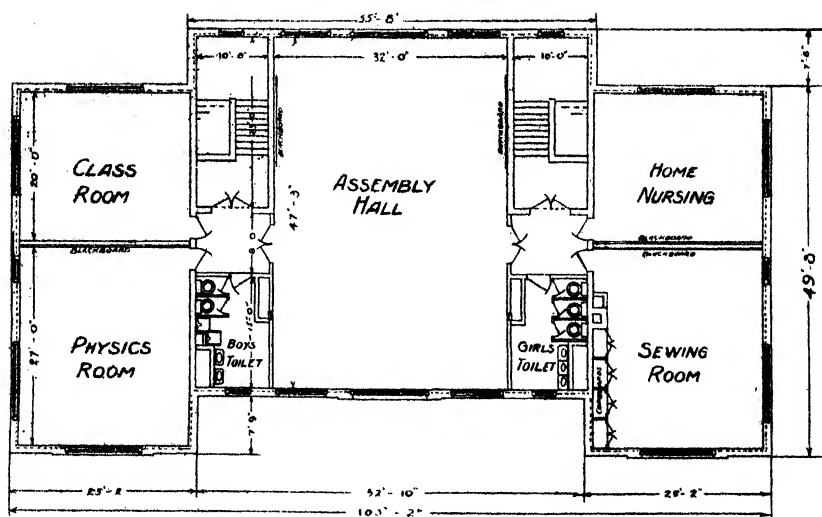
schools a class of students taking the degree work in the university numbering up in the hundreds.

The Department of Agriculture has taken particular care to equip these schools and man them with teachers in such a way that the very best class of agricultural instruction may be given. We are aiming to make the two-year course in the schools the equal of any like course of instruction given in Canada. Particular attention is given to Field Husbandry, Animal Husbandry, and Farm Mechanics. In the latter, a very practical course in farm blacksmithing, including the shoeing of horses and

greatest advantage that we find in the Alberta system is in the number of our institutions and the manner in which they are distributed through the province. The very nearness of a school of agriculture to farmers' sons and daughters is often the greatest inducement for them to attend. If the school were not conveniently situated to them, they might not interest themselves in agricultural education, and in a new country like ours they might not learn enough about the kind of instruction given in these establishments until it was too late for them to start to school again. Besides, many farmers' sons and



GROUND FLOOR PLAN



SECOND FLOOR PLAN

PLAN OF NEW AGRICULTURAL SCHOOLS IN ALBERTA

daughters have a good deal less hesitation in starting in at a school of this kind than they would have in making preparations to attend a larger central institution; but after two years' experience in the school they have a desire for further instruction and often become students at the Faculty of Agriculture in the university so as to complete their training.

In connection with the schools, short courses are given each winter. These are attended by a large number of short-term students or farmers themselves, who find it difficult to become regular students at the schools. The location of the schools in different parts of the province also facilitates work of this kind, and arouses in the community a new interest in agricultural education and what it means to our future methods in farming. In every locality where a school is established there is a spirit of pride among the people in their school,

in what it stands for, and in the advantage it affords to the boys and girls in the neighbourhood, which tends to build up, not only a new interest, but a local pride in scientific agriculture, and spreads the gospel of better farming and the breeding of better live stock on the farms.

The official opening of the three new schools took place recently, and large public meetings were held, which were addressed by the Premier, the Minister of Agriculture, and the President of the Alberta University, as well as a number of other speakers interested in education and its different phases in the province. All of these meetings were not only largely attended, but a very active and real interest was shown by the people who came in their motor cars for miles, not only to attend the meeting but to inspect the schools in operation, and the result of this visit is bound to be a largely increased attendance next year.

AN AGRICULTURAL AND TECHNICAL SCHOOL FOR PRINCE EDWARD ISLAND

THE opening on December 3, at Charlottetown of the Provincial Agricultural and Technical School marked the inauguration of a new departure in the educational system of Prince Edward Island. The school was officially opened by His Honour, Lieutenant-Governor McKinnon, who, in a short address, declared that a more necessary institution could not have been started in the province. Principal Vernon Crockett occupied the chair, and short addresses were given by Premier Bell, Prof. L. W. Gill, Director of Technical Education for the Dominion, Hon. W. M. Lea, Commissioner of Agriculture, and Mr. R. H. Rogers, Chief Superintendent of Education. A few musical selections and some agricultural motion pictures completed the programme.

The school occupies the building formerly known as the Rena McLean Memorial Hospital. Immediately attached is an area of twenty-five acres of land, while the Dominion Experimental Station is within a few minutes walk of the institution.

This new school recently organized by the province in conjunction with the Educational Branch of the Department of Labour for Canada and the Agricultural Instruction Branch of the Department of Agriculture, is primarily for the education of farmers' sons over fourteen who have an inclination to remain on the farm, but is suitable for farmers of any age. There are no tuition fees nor will a scholastic test be required for entrance. Special attention will be given to boys whose educational attainments are deficient. The course

covers two winter periods of twenty weeks each and has been formulated to reach the following objectives:—

1. To give the largest amount of information and training in practical farming in the shortest possible time.
2. To train the farmer how to solve his own problems and increase his net returns.
3. To unfold to him the many opportunities on the farm and the possibilities of rural life.
4. To stimulate him for the filling of a more useful place in the social and economic life of the community.

The subjects to be taken up are as shown below:—

Farm animals;
Crops and fertilizers;
Farm machinery and engineering;
Commercial English;
Dairying;
Farm management;
Civics;
Horticulture;
Poultry;
Commercial arithmetic;
Farm economics;
Woodworking;
Blacksmithing.

Already the school has a day enrolment of thirty, and a total in the evening classes of sixty-two. The hours are from 8.30 a.m. till 4 p.m., and each evening from 7.30 till 9.30. The staff consists of the following qualified instructors:—

Vernon Crockett—Principal and instructor in English, Arithmetic and Rural Economics.
Wm. Reid, B.S.A.—Animal Husbandry.
A. F. Hansuld, B.S.A.—Field Husbandry.

J. R. Waugh—Woodworking and Farm Engineering, mechanical drawing.
Henry Whitlock—Motor Mechanics.
G. S. Rogers—Wireless Telegraphy.
S. Campbell—Blacksmithing.

In addition to the regular course special lectures are given in farm management by Mr. W. M. Lea, Commissioner of Agriculture; in poultry by Mr. Cyrus Poirier, Poultry Division, Live Stock Branch; in Dairying by Mr. F. T. Morrow, Dairy Inspector; and a series of demonstrations are being given throughout the winter by Mr. J. A. Clark, Superintendent of the Experimental Farm, and his staff.

Although the only existing course not directly connected with farming is Wireless Telegraphy, it is hoped that the school will develop into a general agricultural and technical institution, and ample provision has been made for expansion. The number of courses is limited only by the demand for training and the available funds for expansion.

The institution will be financed jointly by the Dominion and Provincial governments. The province will provide one-third of the cost, while the remaining two-thirds will be met from the grants made to the province under The Technical Education and The Agricultural Instruction Acts.

THE CARLETON COUNTY VOCATIONAL SCHOOL, WOODSTOCK, NEW BRUNSWICK

THE Carleton County Vocational School at Woodstock, New Brunswick, has been established in the building donated by the late L. P. Fisher, K.C., for the purposes of vocational education. The building, which was erected in 1913, was originally equipped for giving instruction in agriculture from the Agricultural Instruction Grant. Afterwards, the war intervened and the department of agriculture for the province found it impracticable for the time being

to proceed with organization. The matter remained in abeyance until 1919, when an arrangement was made whereby the institution was taken over by the Carleton County Vocational School Board, and a course of instruction organized in Agriculture, Home Making, Typewriting and Stenography. The school offers a free course of tuition in these subjects to residents of Carleton county who are not less than fourteen years of age. There are no scholastic

requirements as to entrance in the Agricultural and Home Making courses; applicants for enrolment in the Course in Typewriting and Stenography are required to hold High School Entrance certificates. In Agriculture and Farm Mechanics a two year course is provided. The Home Making and Commercial Courses are of one years' duration.

In its relation to the vocation of farming the objective is to provide farm boys and girls with the necessary preparation and training for successful life in the country. The school also aims to become a social centre for the community, with special reference to rural residents. Courses, other than those outlined herein are to be established wherever the demand warrants their establishment. The subjects of instruction in Agriculture are Field Husbandry, Animal Husbandry, Horticulture, Dairying, Poultry, Botany, Veterinary Science, Entomology, Apiculture, Geology, Bacteriology, Citizenship and Economics, Physics, Practical Agricultural Chemistry, English Arithmetic, Benchwork, Forging, Gas Engine and Automobile Repair work, Carpentry, Concrete work and Mechanical Drawing. The Home Making Course includes Cooking, Laundering, Household Chemistry, Dietetics, Sewing, Home Nursing and Home Management, with academic subjects added.

Project Work

Every student in agriculture is required to do project work at the home farm during the summer months, under the supervision of the agricultural teachers. Project Work consists of some work closely related to the subject matter taken up during the school year, and is carried out by the student during the summer according to plans formulated in class-room, putting into practice the principles studied and discussed during the course, whether the project be one in field crops, poultry, dairying or livestock. Before receiving the school's

diploma, the second year student must have successfully completed his senior project. This system does away, to a certain extent, with the necessity or advisability of having a farm in conjunction with the school, and, furthermore, it carries the work of the school and its students out into the country. The supervision work carried on by the agricultural teachers affords the instructors a suitable medium through which to spread the agricultural gospel to the parents and neighbouring farmers—an opportunity which is taken advantage of whenever possible.

Although the school at present only caters to the youth of Carleton county, there are, this year, twenty-six students enrolled for the two year course in Agriculture, there being eighteen freshmen and eight second year students. This attendance, in view of the fact that the school is only in its second year of activity, compares favourably with the enrolment at agricultural schools and colleges throughout Canada, a statement concerning which appeared in the December, 1920, issue of the Gazette. Carleton county has an approximate population of 22,000. The director of the school, Mr. R. W. Maxwell and his assistant, Mr. R. C. Elder, are both graduates of the Ontario Agricultural College, having completed their course with year 1918.

Mr. S. C. Heckbert, a graduate of Mount Allison Academy, Sackville, N.B., is in charge of the departments of Manual Training and Farm Mechanics. Other members of the staff are: J. L. Sullivan, D.V.S., Veterinary Science; Miss Rheta M. Inch, Home Making; Miss Evelyn Greaney, Stenography, and Miss Grace Caughlin, Academic Subjects.

In addition to the sixty-five students enrolled in the regular courses, two hundred of the pupils from the local Public and High schools receive part-time weekly instruction in Domestic

Science and Manual Training. Evening classes, with an enrolment of seventy-five students, are held twice weekly during the winter month. Seasonal and appropriate short courses are

arranged from time to time; one in Gas Engines and Tractor Work is scheduled for the period February 22-26, at which the tractor companies active in this territory will have representation.

OPENING OF "MILLS HALL" AT THE ONTARIO AGRICULTURAL COLLEGE

BY F. THAMAS

THE new men's residence at the Ontario Agricultural College was formally opened on January 11, on the occasion of the convention of the Ontario Experimental Union. The building was named after Dr. James Mills, who occupied the position of president of the college from 1879 to 1904.

President J. B. Reynolds, in a brief address, paid high tribute to Dr. Mills as the man who through the early and somewhat difficult years of the history of the college had so successfully managed the affairs of the institution.

Dr. Mills, in replying, referred to some of his earlier experiences. The college at one time was scorned by the average farmer, and it was only by establishing excursions to Guelph that it had gained popularity with the farming public. This apathy on the part of the farming community, the dragging of college affairs into politics, and the difficulty in procuring adequate funds greatly hampered progress in the early days. Dr. Mills advocated the paying of sufficiently large salaries to retain good men on the staff. Deputy Minister

Roadhouse, in the absence of the Minister of Agriculture, dedicated the new dormitory.

Mills hall is situated on the men's campus directly opposite Macdonald hall. It will accommodate 136 students. The building is L-shaped, three stories high, of Gothic architecture, with a black slate roof. The short wing is 114 feet and the long wing 152 feet. There are two entrances, one facing the men's campus, and the other, the main entrance, over which is inscribed "Mills Hall," faces the dining hall. The masonry of the walls is of Georgetown sandstone and the trim of Ohio sandstone. The layout of the floors is identical with the exception that on the ground floor in the south wing is a large parlour. On each floor is a large wash room finished in marble and white tile, which provides wash basins, showers, baths, and toilets. All the corridor floors are laid in red quarry tile. The walls are stucco and the ceilings white plaster, thus making the rooms bright and sanitary. The rooms are furnished with fumed oak chiffoniers, desks, and chairs.

SEED-CLEANING PLANTS IN ONTARIO

Great increase in the Yield of Cereal Crops would Follow General Introduction. Co-operation the Solution.

FROM AN ADDRESS BY F. C. HART, B.S.A., DIRECTOR, CO-OPERATION AND MARKETS.

THE importance of good seed cannot be over-estimated. I am of the opinion that if every community throughout the province had a power seed-cleaning machine at its disposal,

such machine would pay for itself many times over each year in the increased yield per acre alone. There are in the province about 650 flour and grist mills. There are also 500 power seed and grain

cleaning machines. With regard to these 500 machines, it is estimated that between 75 and 80 are used exclusively in the flax mills, 100 are used in the seed houses for cleaning grasses and clover seeds, and almost all of the remainder are used as grain cleaners in the elevators and flour mills, but not for cleaning the cereal seeds. These figures would indicate that for the planting of five and a quarter million acres of grain every year, a very small proportion of the seed used ever goes through a power machine. The most that can be said, perhaps, is that the great bulk of the seed has had but a passing acquaintance with the fanning mill, the result being, of course, that the yield per acre of our cereals crops is very materially lessened.

In the Canadian West, and in some states across the line, the local elevators are for the most part owned by the farmers themselves. In the province of Ontario, however, with few exceptions, local elevators are not farmer owned, the result being that the local marketing of grain is not on a basis satisfactory to either the grower or buyer. The grain is sold by the grower at a flat price and not on a graded basis, and the careful grower shares his returns with the careless producer so that each is receiving the average price. If such local elevators were co-operatively owned, a grading machine installed and the producer paid for his deliveries on the basis of *graded* grain delivered, taking his screenings home with him, this would result in a local system of marketing much more equitable than the present system. The size of the farmer's cheque, made on the basis of his delivery from the business end of the grading machine, would materially affect his appreciation of the importance of the quality of the seed he sows. To encourage the use of better seed, I suggest that if we had a more satisfactory system of marketing the grain crops, such better system of marketing would demonstrate, from a financial standpoint, the benefits of good seed, and in this direction possibly lies

the solution of a more general use of high-class seed than obtains at the present time.

Aside from the advantages from the seed standpoint of such a system of local marketing, there are many other desirable features involved. Such a system, for example, affords a much easier market. That is to say, the buyer is looking for such grain and the seller does not have the same difficulty in seeking a market for his produce. There are many other such business advantages to be obtained where the local elevators are farmer owned. I mention this matter of the marketing of grain not only because of its influence in bringing home in a practical financial way the benefits of good seed, but also to afford a business organization through which the seed business, as such, can be put on a commercial basis. That is to say, the volume of seed produced in a section is, in many instances, not great enough to carry a respectably sized seed business. Where it can be handled, however, in connection with grain marketing this difficulty is overcome. The seed and grain businesses are interdependent and, where carried on together, the main part of the business, which is grain marketing, will largely carry the overhead.

With seed the farmer is both producer and consumer, and there is no reason why he should not also be his own middleman. Even where it is impossible to establish or take over the local grain marketing, it appears to me that there is room for every community in the province, with the expenditure of very little money, to have a proper seed-cleaning machine. A small building could be rented, and perhaps \$1,000 to \$1,500 expended in the purchase of a small gasoline engine and seed-cleaning machine. Even where there is not an operator who could handle such machine to the best advantage the results would be much more satisfactory than where all the seed in the community simply goes through the individual fanning mill.

A short while ago I stopped off at the village of Cottam, in Essex county, and saw a practical demonstration of what I have been trying to outline. The manager of the local organization of farmers at that point is here to-day and will, I think, bear out the statements I have made above.

Loans to Seed-cleaning Plants

At the 1920 session of the Ontario Legislature an Act was passed to provide for loans to co-operative associations for the purpose of assisting in the establishment of seed-cleaning plants. Provision is made for loans to co-operative organizations incorporated under The Ontario Companies Act. Loans are made up to 50 per cent of the value of the property on which the loan is made and each loan cannot exceed \$3,000. The loan is without interest for two years, after which the interest is 6 per

cent. Half the loan is repayable in five years and the other half at the end of a further period of five years, with the privilege of repaying the loan at any time. While this Act may not be of very great financial assistance, if it arouses interest in the seed question it will have been worth while. In spite of the fact that very few seed centres are operating in Ontario at the present time, their organization has certainly been worth while in arousing interest in connection with the production of good seed. If the seed centres were operated in connection with some other business concern in the locality, it would be of great assistance in establishing these seed-cleaning plants in the rural parts of the province. It appears that if this question of grain marketing on a co-operative basis were established, a natural and inevitable result would be the general use of better seed.

COMBINED STANDING FIELD CROP AND SEED COMPETITIONS IN ONTARIO

BY J. LOCKIE WILSON, SUPERINTENDENT OF AGRICULTURAL SOCIETIES

IN addition to the regular Standing Field Crop Competitions, a new form of competition is available this year in Ontario known as "The Combined Standing Field and Threshed Grain Competition." Prizes will be awarded on the basis of the combined score on crop in the field and the threshed grain. the standing crop will be judged first, but in this competition the threshed grain will also be judged in the bins or sacks of the competitors, the combined scores determining the final award. The Agricultural Society will decide the kind of crop in which to enter.

The regulations governing the new form of competition are in part as follows:—

1. Societies that decide to conduct this special competition will not be eligible to enter the usual Standing Field

Crop Competition with the same kind of grain; they may, however, enter the Standing Field Crop Competition with another kind of crop.

2. Societies deciding to enter this combined competition should have 15 entries.

3. The cleaned seed will be judged either in the sack or bin on the premises of the competitor on or before January 15.

4. The seed used by the competitors must be Registered Seed, or, if this is not available, seed approved by the Provincial Seed Committee.

The following are the varieties from which selection may be made:—

(a) *Oats*.—Banner, O.A.C. No. 72, Victory, Gold Rain and O.A.C. No. 3.

(b) *Barley*.—O.A.C. No. 21 and Mand-scheuri.

(c) *Spring Wheat*.—Marquis, Red Fife, Huron.

(d) *Peas*.—Arthur, Golden Vine, Canadian Beauty.

(e) *Corn*.—North Dakota, Longfellow, Quebec Yellow & Quebec 28,

(f) *Potatoes*.—Green Mountain, Dooley, Carman No. 1, Irish Cobbler, Early Ohio and Gold Coin.

5. All competitors are required to sow the same kind of grain and the same variety. That is to say, if a society decides to enter in oats, it will decide what variety of oats it will select for this competition and each competitor must sow the same variety.

Large prizes are offered for this competition to encourage the production of high-class seed of approved varieties and in substantial quantities.

STANDING CROP AND SEED GRAIN COMPETITIONS IN QUEBEC

BY L. P. ROY, CHIEF OF FIELD CROPS DIVISION

IN order to encourage the farmers of this province to produce pure and strong seed, well suited to the special conditions of each district, the Quebec Department of Agriculture, in conjunction with the Dominion Department of Agriculture, will grant again this year a special subvention to agricultural associations organizing a special competition called "Seed Competition."

This movement, launched in this province in 1919, made splendid headway last year, when twelve agricultural associations participated. In order to further develop, on a commercial basis, the production of pure seed in such districts as are the most likely to produce seed in quantity, and with a view to helping the farmers to harvest high grade stock seed, it was decided to amend the regulations governing the purchase of stock seed. The main clauses of the regulations governing these competitions this year are the following:—

(1) Any association organizing for the first time a seed competition of this kind must, if the crop selected is wheat, oats, barley, peas or buckwheat, purchase for

the competitors sufficient quantities of pure seed to sow the area specified in the regulations.

(2) Samples of at least one pound of the stock seed that it is proposed to use must in every case, be submitted to the department.

(3) The minimum number of competitors for such competitions is twenty-five; when the number is forty, an additional grant of fifty dollars is placed at the disposal of the Association.

(4) The crop entered will be inspected in the field when ripe; a second inspection will be made in winter in the granaries of the various competitors, after the seed has been threshed and selected.

Special steps will be taken this year to encourage, through such competitions, the production of registered seed on a large scale and to establish, in the most suitable districts, production centres in which it will be necessary to set up small local warehouses, fitted with the necessary machinery for the selection and commercial grading of seed.

ORGANIZATION AMONG SEED GROWERS IN ALBERTA

The Beginning of an Important Movement for Supplying Pure Seed

BY PROFESSOR G. H. CUTLER, COLLEGE OF AGRICULTURE, UNIVERSITY OF ALBERTA

Nearly all the provinces of the Dominion and states in the Union have given some attention to the organization of seed-growers. It is not the intention herein to go into a discussion of the different organizations that have been effected, but to refer to what Alberta is prepared to do for those farmers who are interested in, and feel qualified to undertake seed-growing on a scale that makes it worth while not only to the individual but as well to the community at large.

During the past three years the department of Field Husbandry of the University of Alberta has been putting forth every effort to standardize and purify old varieties and breed up new ones of the different farm crops. During that time there has been an insistent and steady demand for pure seed representing suitable varieties, and for information as to how registered seed can be obtained or produced. In answer to these applications for seed, samples in nearly every case have been sent out. The size of the samples has varied from a few ounces for testing to three bushels or more for multiplication. During the past two seasons over fifteen hundred samples of seeds were placed in the hands of interested seed growers who are undertaking to test and multiply given improved and purified strains of the different farm crops. We feel that this is the beginning of a very important movement in seed production in Alberta, but if it is to attain its highest development, organization of a definite character seems imperative. For instance, after spending

years of effort upon the improvement of a given strain of wheat, it is not enough that it be distributed promiscuously. On the contrary, a scheme must be developed whereby strains and varieties can be distributed and multiplied expeditiously, so that they ultimately may reach the greatest number of growers, true to name and variety, and in the highest possible state of purity. In meeting adequately, therefore, the needs of the farmers of Alberta, the University at Edmonton is prepared to co-ordinate all co-operative seed-testing, seed distribution, and multiplication work under one organization to be known as the "Alberta Crop Improvement Association," with headquarters at the university, under the administration of the head of the department of Field Husbandry.

A PROVINCIAL SEED BOARD FOR ALBERTA

A Provincial Seed Board has been established in Alberta consisting of Mr. J. D. Smith, Superintendent of the Seed and Weed Branch, Professor G. H. Cutler of the University of Alberta, and Mr. G. M. Stewart of the Seed Branch of the Dominion Department of Agriculture at Calgary. The Board is already preparing regulations for the control of various competitions organized under the Dominion Seed Branch requirements. These consist of field crop competitions; combined seed crop and cleaned seed competitions; local seed fairs and provincial seed fairs.

POTATO DEMONSTRATIONS IN ONTARIO

Results from the Agricultural Representatives' Demonstration Plots

BY W. D. JACKSON, ASSISTANT DIRECTOR

DURING the past three years, potato demonstrations have been conducted by the Agricultural Representatives, with the idea of showing the relative value of good seed potatoes from Northern Ontario, Old Ontario, and the Maritime Provinces. Only certified seed was used in these demonstrations, except in connection with Old Ontario Green Mountain and Irish

Cobbler, where common stock and certified seed potatoes were both included. The common stock seed was included in the 1920 demonstrations for the purpose of illustrating the difference in yield between common and certified or selected seed.

The results of the demonstrations with Green Mountain and Irish Cobbler varieties for the last three years are as follows:—

	GREEN MOUNTAIN.			IRISH COBBLER.		
	Northern Ontario.	Maritime.	Old Ontario.	Northern Ontario.	Maritime.	Old Ontario.
1918.....	174.9	141.3	168.0	154.7	148.8	122.8
1919.....	169.5	168.7	166.0	131.8	107.6	120.4
1920.....	218.3	215.7	215.8	198.0	210.1	201.1
3 years' Average.....	187.6	175.2	183.3	161.5	155.5	148.1

Comparative yields from certified seed and common local stock seed are well illustrated by the results of 1920. Green Mountain certified seed from New Ontario gave a yield of 218.3 bushels per acre, as compared with 189.2 bushels per acre from Old Ontario common stock Green Mountain. Maritime Irish Cobbler certified seed gave a yield of 210.1 bushels per acre, as compared with 164.9 bushels per acre from Old Ontario common stock Cobbler.

During the growing season, these demonstration plots, which were located in twelve different counties, were very carefully inspected for disease by a representative of the Department of Botany of the Ontario Agricultural College, and accurate records made of the amount of the various diseases, such as Black Leg, Mosaic, and Leaf Roll.

One bushel of certified seed of each variety and from the various sources, sufficient to plant one-tenth of an acre, was supplied to each Agricultural Re-

presentative where a demonstration was conducted. The Representative arranged to have the demonstration conducted on some good farm with uniform soil conditions, well drained and fertilized. The farmer was given assistance in treating the seed for scab and blackleg before planting, and also in laying out and planting the various plots. The farmer was also given instruction and assistance in spraying during the growing season, and accurate records of the yield of each lot were obtained at time of harvesting.

These demonstrations, in each of the three years, have demonstrated the superiority of New Ontario, or northern-grown seed, over Old Ontario and in most cases over New Brunswick seed. The demonstrations will, however, be continued during 1921 with certified seed, with the object of securing still further information on seed potatoes from different sources, and on diseases of the potato crop.

THE AGRICULTURAL GAZETTE OF CANADA

The following table gives the results of the 1920 demonstrations in detail:—

POTATATO DEMONSTRATION, 1920.

COUNTY	GREEN MOUNTAIN				RURAL NEW YORKER		IRISH COBBLER			
	N. Ont.	P. E. I.	Old Ont. Sel.	Old Ont. Common	N. Ont.	Old Ont.	N. Ont.	P. E. I. Sel.	Old Ont.	Old Ont. Common
BRUCE.....	136.5	154.5	242	202	126	132	153	176	181	110
CARLETON.....	193	320	246	216	273	266.6	240	253	226	.....
HALDIMAND.....	208	186	199	182	189	201	153	151	169	148
HASTINGS.....	323.6	303.5	282	282	282	201.6	292.5	282	221.8	.....
KENT.....	190.6	238	243	187	152.6	184	207	229	225	169 Sprouted
MIDDLESEX.....	265.6	250	232	200	333	317	266.7	283.3	316.6	246
ONTARIO.....	230.7	228.08	198.5	236.1	193.2	198.5	193.2	220	216	225
PEEL.....	216.6	169.8	180	168	132	162.6	142.6	180.8	122.6	65
RENFREW.....	241	216	222	204	234	240	205	196	196	134
SIMCOE.....	84	68	108	83	48	74.5	93.3	85.3	102	.....
WELLAND.....	312	240	248	134	256	248	232	254.8	238.1	251.7
TOTALS.....	2401.6	2372.8	2158.5	1892.1	2218.8	2225.8	2178.3	2311.2	2213.1	1319.3
AVERAGE.....	218.3	215.7	215.8	169.2	201.7	202.3	198.0	210.1	201.1	164.9

Bruce Co.—Green Mountain, Old Ontario Selected and Old Ontario Common yield not included in averages.

JUNIOR FARMERS' COMPETITIONS IN ONTARIO

Results of the Profit Competitions in Crops and Live Stock in, 1920

BY W. D. JACKSON, ASSISTANT DIRECTOR OF AGRICULTURAL REPRESENTATIVES

PROFIT competitions with various farm crops and live stock have been conducted for several years by Ontario Junior Farmers under the direct supervision of the Agricultural Representatives. These competitions have been of great value, not only in stimulating interest among the young farmers in field crops and live stock, but also in encouraging them to keep accurate farm records, and to study and follow closely improved methods of management and feeding. All competitions in 1920 were open to young men under 30 years of age, except that winners in previous years were not eligible. Two hundred and forty contestants took part in the various competitions conducted during the past season.

The competitions during 1920 were conducted as follows: Acre Profit competitions with Bailey, Turnips, Corn for

Silage, Sugar Beets, Potatoes, Oats; Dairy Profit competition; Baby Beef competition, and Feeding Hogs for Profit competition. In estimating the cost of production in the Acre Profit competitions, labour, etc., was computed on the following basis: Man labour, 30 cents per hour; horse labour, 15 cents per hour; barnyard manure applied to crop in competition, \$1 per ton, and to the previous crop, 50 cents per ton. The rent of land charged against the crop was one-eighth the selling value of land in the district. Cost of ploughing was figured at a flat rate of \$4 per acre. In these competitions nothing was allowed for overhead expenses such as depreciation on implements, etc.

Values used in compiling the reports are as follows:—

ACRE PROFIT.

<i>Value Seed used in Planting.</i>	<i>Value Product Harvested.</i>
Turnips. \$1.00 per lb.	\$.15 per bushel.
Potatoes. 3.00 per bus.	.90 "
Oats. 1.25 "	.70 "
Barley. 2.00 "	1.00 "
Corn for silage. 2.75 "	6.00 per ton.
Sugar beets.15 "	12.00 "

For Feeding Hogs, Baby Beef and Dairy Profit, value of feed consumed was as follows:—

Ground oats. \$60.00 per ton.	Low grade flour or red dog. \$ 70.00 per ton.
Ground barley. 55.00 "	Tankage. 100.00 "
Ground peas. 90.00 "	Hay. 18.00 "
Ground rye. 65.00 "	Alfalfa. 20.00 "
Ground wheat. 85.00 "	Straw. 8.00 "
Ground corn. 65.00 "	Silage. 6.00 "
Corn on cob. 60.00 "	Roots. 6.00 "
Bran. 45.00 "	New milk. 50.00 "
Shorts or middlings. 52.00 "	Skim milk. 9.00 "
Oil cake. 80.00 "	Buttermilk. 7.00 "
Cotton seed meal. 84.00 "	Whey. 4.00 "
Gluten feed. 72.00 "	Green feed 2.00 "

Pasture, \$1 per hog; \$1 per month in Dairy Profit competition and 75 cents per month in Baby Beef competition. Nursing cow, \$6 per month in Baby Beef competition.

In Feeding Hogs for Profit competition, value hogs, live weight, fed and watered, at \$19 per cwt.

In Baby Beef competition, value Baby Beef at 16 cents per pound.

THE AGRICULTURAL GAZETTE OF CANADA

In Dairy Profit competition, Butter Fat valued at 63 cents per pound for first three months and 60 cents per pound for rest of period, and value skim milk at 45 cents per cwt.

The prize for the winner in each competition consisted of railway transportation, board and lodging while attending a two-weeks' course in Agriculture at the Ontario Agricultural College, Guelph, or the Kemptville Agricultural School, Kemptville. The winners in Western and Northern Ontario attend the courses at the Ontario Agricultural College, while the Eastern Ontario winners attend the course at Kemptville Agricultural School. Thirty-one winners in the various competitions conducted during 1920 were provided with transportation to Guelph to attend short courses, and similar provision was made for fifteen winners in Eastern Ontario to attend the Agricultural Short Course at Kemptville.

In each Acre Profit competition the prize was awarded to the competitor showing the largest net profit per acre. In the case of grain crops each contestant competed with field of at least five acres and was permitted to also enter the Standing Field Crop competition, while in the case of roots, potatoes and corn, the area was one acre. The contestants were required to keep accurate records of labour, cost of seed, fertilizer, etc., and in making awards all costs, including cost of hauling from field, were taken into consideration.

In the Baby Beef competition the prize was awarded to the contestant producing the best steer. Each contestant

was required to care for and feed the calf and keep an accurate record of the kind and amount of feed consumed. Only calves born after September 1 were allowed to be entered and the competition concluded in November of the year following.

The awards in the Dairy Profit competition were based on the largest net return from one heifer. The contestant in this case was required to feed and care for the animal, keep accurate records of feed consumed and of the milk production. The contestant also secured a 2-ounce sample of the animal's milk three times per month. These samples were forwarded to the Agricultural Representative to be tested for butter fat. The cost of feed consumed, together with the value of the butter fat and skimmed milk, were taken into consideration in computing the net profit.

The Feeding Hogs for Profit competition awards were made on the following basis: 50 points for highest net profit per cwt. of gain, 25 points for type and finish, and 25 points for best kept records and report. Each contestant was required to feed at least four hogs, keep an accurate record of kind and amount of feed consumed; also to produce accurate information as to date of birth of animals, weight at six weeks of age, when feeding period commenced, and certified weights of hogs at conclusion of feeding period. From the records provided the net profit was computed, points being deducted for hogs over 220 pounds or under 180 pounds live weight.

THE AGRICULTURAL GAZETTE OF CANADA

The following tables furnish a list of the winners and particulars concerning yield, cost of production, and profit:—

FEEDING HOGS FOR PROFIT COMPETITION, 1920.

County and Winner	Length of feeding period	Av. cost of feed per hog	Av. wt. of hogs, live wt.	Av. gain in weight from six weeks of age	Value per hog of gain in weight	Av. net profit per hog	Av. net profit per cwt. of gain
		\$ cts.	lb.	lb.	\$ cts.	\$ cts.	\$ cts.
LANARK. Neil McIntosh, Almonte, No. 5	Apr. 29– Oct. 9.	12 07	186½	165	31 35	19 28	11 68
75% Chester White, 25% Yorkshire.							
MANITOULIN. Stanley Stringer, R.R. 1, Sheguindah.	May 28– Nov. 5.	13 96	209½	187½	35 58	21 62	11 54
Yorkshire-Chester.							
LAMBTON. Elgin V. Fuller, R.R. 4, Watford.	Feb. 2– June 24.	13 59	195	170	32 30	18 71	11 00
Yorkshire.							
KENT. John Langford, Kent Bridge.	June 1st– Nov. 30.	17 29	212½	189	35 91	18 62	9 85
Tamworth and Chester grade.							
LENNOX AND ADDINGTON. Kenneth Hill, Bath, Ontario.	June 8– Nov. 9.	20 70½	234½	226½	43 03½	22 33	9 85
Yorkshire and Berkshire.							
NORFOLK. Jas. Pepper, Simcoe, R.R. 6.	May 19– Nov. 19.	21 08	226	200	38 00	16 92	8 46
Chester-White and Berks.							
WELLAND. Ed. O. Drysdale, Welland, R.R. 3.	May 29– Nov. 26.	20 57½	215	191	36 29	15 71½	8 23
Pure-bred Yorkshire.							
MUSKOKA. Stanley Anderson, Powassan, R.R. 1.	May 31– Sept. 15.	16 97	180	155	29 45	12 48	8 05
Yorkshire and Berkshire.							
ONTARIO. Delson Shier, Cannington.	May 12– Oct. 14.	21 00	201	178½	33 87	12 87	7 22
Yorkshire.							
WATERLOO. Donald Robertson, R.R. 2, Ayr.	May 3– Nov. 23.	22 99½	215	194½	37 00	14 01	7 20
Yorkshire Grade.							
DUNDAS. Geo. B. Baker, Newington.	May 7– Oct. 22.	27 66	175	157	29 83	2 17	1 38
Tamworth, pure-bred.							

THE AGRICULTURAL GAZETTE OF CANADA

BABY BEEF COMPETITION, 1920.

County, Winner and Breed	Date of Birth	Total cost of feed consumed, plus initial value of steer, \$5	Weight of Steer	Value	Net Profit	Total score on conformation, according to score card.
		\$ cts.	lb.	\$ cts.	\$ cts.	
BRANT. Robt. Cochrane, Ayr, R.R. 3.	January	148 20	1000	160 80	\$11 80	.....
HURON. Wilbur Turnbull, Brussels, R.R. 2.	January 19, 1920.	114 98	810	129 60	15 62	86½
Shorthorn grade.						
A. W. Etherington, Hensall, R.R. 1.	Nov. 28, 1919.	109 10	900	144 00	34 90	84½
Shorthorn.						
LAMBTON. T. Alex Edwards, R.R. 4, Watford.	Dec. 20, 1919.	83 70	660	105 60	21 90	68 5
Aberdeen Angus Grade.						
ONTARIO. Orvan Chambers, Wilfrid.	.....	110 22	940	150 40	40 18	92
WATERLOO. O. E. Lerch, R. R. 2, Preston.	Dec. 2, 1919.	125 81	975	156 00	30 19	91
Shorthorn.						
WELLINGTON. Gordon Saunders, Arthur.	Sept. 8, 1919.	102 90	950	152 00	49 10	75
Shorthorn Grade.						

DAIRY PROFIT COMPETITION, 1920.

County and Winner	Value of Feed	Milk	Fat	Fat	Value	Skim-milk	Value	Net Profit
	\$ cts.	lb.	%	lb.	\$ cts.	lb.	\$ cts.	\$ cts.
LENNOX AND ADDINGTON. Percy Merritt, Silsville.....	36 69	9,099½	2·83	254·59	156 33	8,844·41	39 79	159 43
DUNDAS. Jas. Deeks, Williamsburg.....	57 40	6,864·3	3·57	245·06	150 40	6,619·24	29 78	122 78
Ayrshire.								
LANARK. Herb. James, R.R. 2, Almonte....	49 75	6,401	3·1	194·05	119 23	6,206·95	27 92	97 40
Holstein.								
PRESCOTT AND RUSSELL. Gregorie Chatelain, Curran.....	36 16	4,937·5	3·75	181·43	111 19	4,756·07	21 40	96 43
Grade Ayrshire.								

THE AGRICULTURAL GAZETTE OF CANADA

County.	Winner	Yield	Value	Cost Produce	Profit
Manitoulin.	Alfred Harold Burt, Gore Bay.....	bush. 268	\$ cts. 241 20	\$ cts. 103 72	\$ ct. 274 9
	Sand, following pasture, farmed forty years, sprayed, Davies Warrior, 7 loads manure.				
Middlesex.	Wm. West Taylor, R.R. 1, Ettrick.....	300	270 00	106 20	163 8
	Light loam, following hay, farmed forty years, Paris green, Green Mountains.				
Lanark.	Kenneth Robertson, R.R. 2, Almonte.....	267	240 30	106 08	134 2
	Sandy loam, following hay, farmed four years, Paris green, Green Mountains.				
Norfolk.	Howard Turvey, R.R. 1, Vittoria.....	280	252 00	124 35	127 6
	Clay loam, following corn, farmed 50 years. 250 lb. commercial fertilizer, arsenate of lead, Irish Cobblers.				
Peterboro.	Joseph Carr, R.R. 2, Havelock.....	217	195 30	69 25	126 0
	Sandy loam, following oats. Paris Green, Irish Cobbler.				
Grenville.	Frederick J. Higgs, Kemptville.....	165	148 50	79 95	68 5
	Sandy loam, following potatoes, farmed 30 years, 10 loads barnyard manure, Paris Green, Pioneer Pride.				
Simcoe.	Clifford M. Martin, New Lowell.....	168	151 20	95 85	55 3
	Sandy loam, following oats, farmed 47 years, 16 loads barnyard manure. Paris Green, American Wonder.				

ACRE PROFIT COMPETITIONS.

	BARLEY, \$1.00 PER BUSHEL.	bush.	\$ cts	\$ cts.	\$ cts.
Lennox and Addington.	Allan Craven, No. 1, Bath.....	42	42.00	23.03½	18.96½
	Sandy loam, following potatoes, farmed 100 years, O. A. C., No. 21.				
	TURNIPS, 15c. PER BUSH.				
Muskoka and Parry Sound	Newton Anderson, R.R. No. 4, Powassan.....	818	122 70	71 62	51 08
	Clay loam, following potatoes, farmed 30 years, 12 loads manure, Purple Top Swede.				
York.	Chas. F. Casey, R.R. No. 3, King.....	857	128 35	99 70	28 65
	Clay loam, following oats, farmed 25 years, 25 loads manure, Purple Top Swede.				
	CORN FOR SILAGE, \$6 PER TON.				
Huron.	Cecil J. Stewart, R.R. No. 1, Kirkton.....	26 tons.	156 00	47 78	108 22
	Clay loam, following oats, farmed 50 years, 10 loads manure, Early Imperial Leaming, 3 parts to 1 of White Cap.				
Peterborough	Russell Jenkins, R.R. No. 1, Norwood.....	23 "	138 00	40 73	97 27
	Clay loam, following corn, farmed 60 years, 10 loads manure, Big Crop ensilage corn.				
	SUGAR BEETS, \$12 PER TON.				
Kent.	Geo. E. Sherman, R.R. No. 1, Northwood.....	28 tons. 1,121 lbs.	342 72	132 66	210 06
	Clay, following tobacco, farmed 50 years, 8 loads manure.				

THE AGRICULTURAL GAZETTE OF CANADA

ACRE PROFIT COMPETITIONS.

County	Winner	Yield	Value	Cost. Produce	Profit
OATS, 70c. PER BUSHEL					
Frontenac.	John Watts, Wolfe Island.....	bush. 95	\$ cts. 66 50	\$ cts. 23 45	\$ cts. 43 05
	Black loam, following oats, farmed 50 years, Banner.				
Wentworth.	Daniel T. Fletcher, R.R. No. 1, Hannon	90	63 00	25 50	37 50
	Clay loam, following barley and blue grass, half each, farmed 40 years.				
Lennox and Addington.	D. R. Sharpe, R.R. No. 2, Napanee.....	77 11 lbs.	54 13	20 25	33 88
	Black clay, following summer fallow, farmed 80 years, Banner.				
Wentworth (2nd prize)	Walter Wilson, R.R. No. 4, Hamilton..... R.R. No. 4, Hamilton.....	80	56 00	24 55	31 45
	Clay loam, following corn and potatoes, farmed 60 years, Scottish Chief.				
Middlesex.	Harold Pack, R.R. No. 1, Byron.....	80½	56 35	25 32	31 03
	Clay loam, following potatoes, formaldehyde, O. A. C., 72, farmed 75 years.				
Lambton.	Russell C. Parker, R.R. No. 8, Watford.....	67 23 lbs.	47 37	25 78	21 59
	Sand following corn, farmed 35 years, Banner.				
Wellington.	Harvey Logghead, R.R. No. 1, Belwood.....	55	38 50	17 10	21 20
Elgin.	Cecil Bowen, Aylmer.....	75¼/17	52 67	31 75	20 91½
	Clay and sandy loam, following corn, farmed 30 years, Swedish Giant.				
Welland.	Leo. B. Haist, No. 5, Fenwick.....	62	43 40	23 74	19 66
	Sand and black loam, following corn and pasture, farmed 75 years, O.A.C. 72.				
Norfolk.	Max Everett, R.R. No. 2, Simcoe.....	69½	48 72	33 52	15 20
	Sandy loam, following corn, farmed 50 years, Banner oats.				
Prescott and Russell.	Simon Bertrand, R.R. No. 2, L'Orignal.....	49	34 30	24 02	10 28
	Clay loam, following Oats, farmed 30 years, Banner.				

JUNIOR FARMERS FROM ONTARIO VISIT THE INTERNATIONAL LIVE STOCK SHOW

Winners of Judging Competitions Given a Trip to Chicago.

A PARTY of fourteen junior farmers from various parts of Ontario visited Chicago and the International Live Stock Show in December. The members of the party, with one exception, were winners in the Inter-

County Judging Competitions at Guelph and Ottawa, local County Judging Competitions, or winning coaches of School Fair Judging teams. The prize in each case consisted of expenses for the trip to Chicago.

THE AGRICULTURAL GAZETTE OF CANADA

The prize winners, the competitions in which they won their prizes and the donors, are as follows:—

NAME	COMPETITION	DONOR
Burns McCorquodale, Embro...	Inter-County Live Stock Judging Competition Championship Contest. High Man on Western Ontario team.	Armour's Bureau of Agricultural Research and Economics, Chicago, Ill.
Echlin Croskery, Kinburn....	Same as Above. High Man on Eastern Ontario Team...	Bureau of Agricultural Research and Economics, Chicago, Ill.
Pringle Brown, Ayr.....	Brant County Judging Competition	Canadian Packing Co., Brantford.
Frank Town, Woodstock, No. 1.	Oxford County Judging Competition	Com-Jas. Harris, Harris Abattoir Company.
Howard Hallock, Woodstock, No. 6....	Oxford County Judging Competition	Com-Jas. Harris, Harris Abattoir Company.
W. G. Shaw, R.R. 2, Mono Road.	Peel County Judging Competition	Local Contribution.
G. O. Kirk, R.R. No. 1, Inglewood....	Peel County Judging Competition	Local Contribution.
Harvey Hallman, R.R. 1, Ayr.	Waterloo County Judging Competition	Com-Harris Abattoir.
Fred M. Snyder, R.R. 1, Waterloo....	Waterloo County Judging Competition	Com-Harris Abattoir.
Willie Watson, R.R. 1, Troy..	Wentworth County Judging Competition	Junior Farmers' Improvement Ass'n.
Norman Bell, R.R. 1, Glanford Station....	Wentworth County Judging Competition	Royal Bank.
Jas. Oliver, Kintore.....	Coach for School Fair Judging Team	Rural Service Department, Merchants' Bank.
Robert Calder, Kintore.....	Coach School Fair Judging Team	By Friends.
W. J. McCorquodale, Embro...	Financed own trip	

Armour's Bureau of Agricultural Research and Economics, which paid the expenses of two of the party, very kindly offered to entertain the Ontario boys during their stay in Chicago, as a part of Armour's Club Tour party, consisting of about 500 winners in Boys' and Girls' Club work throughout the United States, which was visiting Chicago at the same time. Upon arrival at Chicago, therefore, the Ontario boys joined the Armour Junior Club Tour party and were shown every consideration during the entire trip. At the Junior Club Rally and Reception the boys from Ontario were given a very enthusiastic reception, not only by the officials in charge of the Junior Club Tour, but also by the State Club leaders and Boys' and Girls' Club members.

Visits were made to the International Live Stock Show, Armour's Meat Packing and By-products plant, the Art Institute, Marshall Field's Department

Store, the financial district, Lincoln Park, the Zoo, and the McCormick plant and were entertained in the Armour Gymnasium by the Armour Dramatic Club, Orchestra and Glee Club. Every effort was made by Mr. G. L. Noble of Armour's Bureau of Agricultural Research and Economics to see that every person in the party was shown every courtesy and consideration.

At various times during the week, addresses were delivered to the party by such prominent United States officials as Secretary for Agriculture Meredith; J. R. Howard, President American Farm Bureau Federation; Geo. E. Farrell, in charge of Boys' and Girls' Club Work in Northern and Western States; O. H. Benson of Eastern States League and others.

The educational value of this trip cannot be over-estimated and will doubtless have far-reaching effects. The boys

making this trip, seeing Chicago, its industrial plants and the International Live Stock Show, received not only an education but an inspiration which will be reflected in the Junior Farmers' movement throughout Ontario. These young men have already been called

upon to address Junior Farmers' meetings on their trip and its educational value. County Judging Competitions will undoubtedly increase, and it is expected that arrangements will have to be made for a much larger party this year.

SHEEP IMPROVEMENT WORK IN QUEBEC

BY ALPHONSE LAFLAMME, DISTRICT AGRONOMIST, BEAUCE COUNTY

THE work done in Beauce county, Quebec, towards the improvement of sheep raising was as successful as could be desired. Various means were taken to make the farmers realize the importance of this movement. Series of lectures were given explaining the advantages that would result from the improvement of the flocks. It was necessary in some cases to go and see the farmers at home in order to give them fuller and more definite information. These home visits were very successful, and are regarded as one of the best methods for obtaining results. Once the farmers had fully understood the advantages of such a move, general meetings were called and syndicates of 25 or 30 farmers were formed. One of the farmers was selected and sent to purchase sheep with the help of an officer of the Dominion Department of Agriculture. Generally when the carloads of sheep arrive, there is no difficulty in disposing of them. Most farmers like to secure choice animals, with which they may compete at competitions and at fairs. The question of prices

takes a secondary importance when animals are really good. Black-faced breeds are beginning to attract the attention of the farmers, and any prejudice that may have been entertained against such breeds in the past is rapidly disappearing. The Leicester breed has been very common in Beauce for a number of years. Other breeds were rather scarce before this year, but it may be said that the "Down" breeds will rapidly become common in this district. Farmers are convinced that they are the best breeds for the meat as well as for the wool. We are now trying to get the syndicates in good working order. Information on the care of the flock is given to the farmers. It must be admitted that the farmers' sheepfolds are not perfect, but I trust the feeding competition organized by the Dominion and Provincial Departments of Agriculture will help to improve the situation.

As regards the sale of wool through the Co-operative Wool Grower's Association some work has been done in this direction; 5,000 pounds were shipped last year and I think a larger quantity will be shipped in the future.

AN AGRICULTURAL SURVEY IN MANITOBA

An agricultural survey of Manitoba will be undertaken by the Department of Agriculture and the Agricultural College. It is proposed to find out the exact condition of agriculture in the province, and on this information, devise remedies that will put the industry on a better and more profitable basis. Fore-

most of the farm problems of Manitoba is the situation in the extreme southwestern area. Crops in that area have been a partial failure for several years, rust, drought, weeds and grasshoppers combining to create conditions under which growing anything was a continual and rarely successful struggle.

SASKATCHEWAN BETTER BULL CAMPAIGN

Education to be Followed by Legislation

BY J. G. ROBERTSON, LIVE STOCK COMMISSIONER

At the request of and in conjunction with the Saskatchewan Cattle Breeders' Association, the provincial Department of Agriculture through the Live Stock Branch propose starting a campaign for the improvement of the sires that are used for the production of live stock in Saskatchewan. In order to manage the campaign properly, it will be handled by one member of the staff of the Live Stock Branch who will devote all his time to this work, and who will be directly responsible to the Live Stock Commissioner, who is also the secretary of the Cattle Breeders' Association.

There is no doubt as to the need of such a campaign, for with the large increase in cattle production which this province has experienced, large numbers of cattle are now being raised by men who have little experience in the business, and who apparently do not appreciate the value of a good, pure bred sire. Statistics show that there are nearly 30,000 bulls in Saskatchewan and it is estimated that a very large proportion of these are grade or scrub animals. Efforts

will be made in this campaign by getting in touch with the owners of such bulls to induce them to replace them with pure-bred animals. If good results can be obtained, in two or three years time there is no doubt that the quality of the beef cattle shipped from Saskatchewan farms will be increased in value by at least \$1,000,000.

It is proposed to conduct the campaign on a basis of publicity and education for the first year at least. After considerable work has been done by such methods through the Press, the agricultural societies, the municipalities, co-operative shipping associations, and through meetings held at various points, it is believed that the province will be ready for legislation, the object of which will be to encourage and bonus the keeping of first class sires, and also to make it an expensive luxury to be the owner of a scrub bull. This legislation has not been promised by the government, but the Minister has assured the Cattle Breeders' Association that he is very much in sympathy with the campaign.

DAIRYING AND FIELD HUSBANDRY SPECIAL TRAIN FOR SASKATCHEWAN

The Department of Agriculture co-operating with the Canadian Pacific Railway Company and the Extension Department of the University of Saskatchewan, is this year operating two agricultural instruction cars over the lines of the Canadian Pacific Railway in the South-western part of the province. The series of meetings will begin on January 17, and continue until about the end of March.

During several winters past the Dairy Branch of the Department of Agriculture has operated a special dairy instruction car over the different lines of rail-

way in the province. This year in addition to the car for dairying work, a second car is being added to deal with field husbandry questions, and more particularly to discuss and bring before the people in south-western Saskatchewan the work and findings of the Better Farming Commission. This Commission was appointed by the Saskatchewan Government following the Dry Farming Conference held at Swift Current last summer. Extensive investigational work has been carried on by the Commission and the results, while of great interest

and value to all engaged in dry farming work, is of particular interest to the south-western portion of the province.

The special dairy car will be equipped with stereopticon, and lantern slides will be used to illustrate practically all phases of dairying work. A moving picture machine will also be carried in this car and films illustrating various phases of development in both the dairying and live stock industries will be exhibited. The lectures in the field husbandry car,

while dealing with general problems of crop production, will give special attention to matters of farm management, rotation and growing of crops, more directly relating to dairying and live stock.

The C.P.R. are furnishing the two lecture coaches and a third car for the accommodation of the speakers free of charge, while the Department of Agriculture and the Extension Department of the University are furnishing the necessary equipment and the speakers.

EXHIBIT OF ALBERTA BRED AND FED STEERS AT THE CHICAGO INTERNATIONAL

THE College of Agriculture of the University of Alberta made an exhibit of fifteen Alberta-bred and fed steers at the International Live Stock Exhibition, Chicago, in 1920, in order to advertise in the United States the class of cattle bred in Western Canada.

Leading beef breeders in Alberta agreed some time ago to donate calves to the provincial university to be used in class-room judging work. It was believed that this work could be made more valuable to the students if, instead of using ordinary steers, animals of higher merit could be obtained. The cost of labour, feed and housing would be practically the same, but sufficient funds

were not available to enable the institution to buy the best animals. Calves were offered by thirty-two breeders. The agreement reached was that the university should prepare and exhibit the animals in such a way as would prove an advertisement to the province and to the donors.

The calves were received during the summer and fall of 1919. Grade calves were not barred, but pure bred were preferred. They were available for class-room work for two seasons; an exhibit was then made at the 1920 Chicago International, five animals from each of the leading beef breeds being selected by committees appointed by the Breed Associations.

Particulars as to the exhibit will be found in the following statement:—

STERS FITTED FOR 1920 INTERNATIONAL

Breed	Breeder	Date of Birth	Date Shipped to University	Weight August 1 1919	Weight Nov. 1 1920	Gain	Gain per Month	Show Age
1. Hereford	Curcie Cattle Co.	Jan. 22, 1910	July, 1919	535	1545	1010	67.33	Junior yearling.
2. Hereford	John McD. Davidson	May 26, 1919	July, 1919	255	1330	1075	71.66	Junior yearling.
3. Hereford	Pym Bros.	April 18, 1919	July, 1919	340	1355	1015	67.66	Junior yearling.
4. Hereford	S. M. Mace	April 6, 1919	July, 1919	355	1370	1015	67.66	Junior yearling.
5. Hereford	V. W. Smith	Jan. 6, 1919	July, 1919	435	1310	875	58.33	Junior yearling.
6. Hereford	John Wilson	May, 14, 1919	Nov. 1919	485	1245	760	69.09	Junior yearling.
7. Hereford	Frank Collicut	Jan. 15, 1919	April, 1920	1050	1350	300	*43.90	Junior yearling.
8. Aberdeen Angus	C. H. Richardson	Nov. 20, 1918	July, 1919	515	1475	960	64.00	Senior yearling.
9. Aberdeen Angus	A. E. Noad	Mar. 15, 1919	July, 1919	400	1390	990	66.00	Junior yearling.
10. Aberdeen Angus	Chas. Ellett	May 1, 1919	July, 1919	310	1230	920	61.33	Junior yearling.
11. (Grade) Aberdeen Angus	Canada Land and Irrigation Co.	April 15, 1919	July, 1919	315	1225	910	60.66	Junior yearling.
12. (Grade) Aberdeen Angus	J. D. McGregor	April 24, 1919	July, 1919	285	1160	875	58.33	Junior yearling.
13. Aberdeen Angus	Loftus and Dickson	Jan. 29, 1920	June, 1920	405	810	405	**101.25	Junior calf
14. Shorthorn	University of Alta.	May 23 1919	Oct., 1919	230	1350	1120	74.66	Junior yearling.
15. (Grade) Shorthorn	Hon. Duncan Marshall	Sept. 3, 1919	Oct., 1919	190	1190	1000	**83.33	Senior calf.

More mature when received—hence lower gains would be expected.
Heaviest gains would be expected with younger calves.

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The exhibit won second prize for herd of five steers, any age or breed,—Clay Robinson Special, open to all Colleges

breed; 3rd, pure-bred junior Angus calf; 5th, senior yearling, pure-bred Angus class; 7th, open junior yearling pure-



PRIZE WINNING HERD OF ALBERTA BRED STEERS AT THE CHICAGO INTERNATIONAL

and Experimental Stations. In the pure-bred junior Hereford class, six animals were placed in the top twenty. Other winnings were: 1st, junior yearling, any

bred Hereford class; 4th, Clay Robinson Special, junior yearling, any breed, in herd of five head, and 8th in Junior yearling shorthorn class.

NEW BRUNSWICK'S MINISTER OF AGRICULTURE

THE HON. D. W. MERSEREAU

New Brunswick's new Minister of Agriculture, Hon. D. W. Mersereau, the son of the late Leonard Mersereau, of Loyalist stock, was born at Fredericton Junction, Sunbury county, N.B., in 1870. He was educated in the Fredericton Junction grammar school.

Prior to entering provincial politics, he occupied a prominent place in municipal politics in his native county, representing the parish of Gladstone as county councillor for several years. He was employed in the Canadian Pacific Railway telegraph maintenance department

for upwards of twenty years and in that capacity had the reputation of bringing good judgment to bear on the work as well as being an exceptionally good handler of men, a characteristic that tended for loyal, efficient subordinates. He has been chairman of the Agricultural Committee of the Legislature, where he showed marked ability. He owns and operates a farm at Fredericton Junction, where mixed farming is carried on. He has a good grasp of the needs of the farmers of New Brunswick and in his present capacity will have a good

opportunity to establish progressive measures for their benefit.

As a man who has had considerable experience in the judicious handling of men, he will undoubtedly be able to

strengthen and reorganize his staff, giving them a measure of free hand, which is absolutely essential for the success of any organization and the development of initiative in its members.

PRODUCTION OF PULVERIZED LIMESTONE IN NEW BRUNSWICK

BY O. C. HICKS, B.S.A., INSTRUCTOR OF SOILS AND CROPS

To meet the farmer half-way in his efforts to maintain soil fertility and continue crop production, the provincial Department of Agriculture established a limestone grinding factory at Brookville, four miles from the city of St. John, to supply agricultural lime at a moderate price.

More than fifteen hundred tons of pulverized limestone were sold and shipped to farmers in every county of the province during the fall of 1920. The daily shipment is now forty tons, with the prospect of an increased output as spring approaches.

The grinding factory is a three-story building, modern in equipment. The quarry-face abuts the factory and a spur railway siding permits loading of the cars directly from the pulverizer. The rock-reducing machinery consists of a large jaw crusher for coarse crushing, a ring-roll pulverizing mill, and steel equipment for screening, elevating, conveying, weighing and sacking. A seventy-five horse-power electric motor supplies the power.

The finely-powdered condition of the product is shown by the following analysis by Dr. F. T. Shutt, Dominion Chemist:—

Passes 10-mesh sieve (100 meshes per square inch), 100 per cent.

Passes 20-mesh sieve (400 meshes per square inch), 99.7 per cent.

Passes 60-mesh sieve (3,600 meshes per square inch), 7.40 per cent.

Passes 80-mesh sieve (6,400 meshes per square inch), 62.1 per cent.

The department will carry on, in 1921, a comprehensive series of co-operative experiments in liming land to demonstrate the value of pulverized raw limestone rock in the production of hay, clover, grain, and mangolds, and in the eradication of the causal organism of club root.

Now that a favourable opportunity offers for securing this much-needed ingredient for the maintenance of soil fertility, at \$3 per ton, bulk, carlots, f.o.b. Brookville, and at special low railway rates to points within the province, it is expected that the utilization of this home product will become widespread.

THE DAIRY SITUATION IN NEW BRUNSWICK

BY GEORGE THIMENS, DAIRY INSTRUCTOR

The dairy industry in New Brunswick established a new record in 1920, both in the quantity of milk produced, and in the value of the product. Formerly, the development of the dairy industry of the province was chiefly towards cheese making, but during the past few years

the manufacture of butter has been increased. With well-equipped central creameries started throughout the province, the making of the butter is likely to be carried on more extensively. A new central creamery was started last

THE AGRICULTURAL GAZETTE OF CANADA

summer at Fredericton known as the Farmers' Co-operative Dairy Company. This concern has an up-to-date equipment for both butter and ice cream manufacture, and has made a successful start, although it was quite late in the month of June before it began operations. December showed 112 patrons supplying cream to this creamery.

The Farmers' Co-operative Creamery Company at Moncton also made remarkable progress. The patrons supplying cream increased in number from 602 in 1919 to 990 in 1920, and it became necessary to enlarge the whole plant in order to take care of the business. A chemical cold storage plant is being installed. This is now the most flourishing creamery in the maritime provinces. The Sussex Cheese and Butter Company at Sussex found it necessary to instal two 400-gallon pasteurizers in order to take care of all the cream being received. At the Madawaska Creamery at St. Hilaire, under the control of the provincial Department of Agriculture, the output was also gratifying. As soon as conditions will permit, another central creamery will be organized in Gloucester county

to take care of that section of the province. With the establishment of these large central creameries the province will soon be on a sound basis to take care of the industry throughout the dairy sections.

Although the output of New Brunswick cheese decreased somewhat during last year, we must not conclude from this that the dairy industry is declining. The truth is that the milk producers are finding a more profitable market for their product in other lines of manufacture, a considerable proportion of the milk being used in the cities, and a large amount of cream employed in the making of ice cream.

The following table shows the quantity and value of cheese and butter for 1920 compared with 1919:—

CHEESE.		
	Lb.	Value.
1919	1,256,388	\$347,772 00
1920	1,213,904	331,290 00
BUTTER.		
	Lb.	Value.
1919	915,816	504,602 00
1920	1,036,032	626,156 00
1920 Ice cream, estimate at ..		500,000 00

CO-OPERATIVE MARKETING PRINCE EDWARD ISLAND

IN the spring of 1913, the farmers of Prince Edward Island became interested in what eventually developed into a concerted and successful effort to market their eggs co-operatively. Some forty local associations or Egg Circles were organized, these forming the nucleus of the Prince Edward Island Co-operative Egg and Poultry Association, which was incorporated under an Act passed by the provincial legislature early in 1914. In 1917, the constitution was amended to provide among other things that each local egg circle—the organization of which had been approved by the executive of the central association

and registered on the books of the association—should have the full powers of a separate corporation, constituting federated branches of the central association.

The success of this movement encouraged the producers of Prince Edward Island to extend their efforts to other lines of produce, and to this end on December 17, 1919, The Canada Farm Products was incorporated. The organization that receives and markets the eggs of the circles is a federation of these circles. Each collects its own membership fees, 25 per cent of which is paid into the central organization.

Each egg circle engages its own egg collector, who undertakes to collect the eggs of local members at least once a week during the summer months, pack them in such a manner as to ensure their identity, ship them to the central candling station, and make returns to the members on the basis of returns received from the central warehouse.

Egg cases are supplied by the central organization, and to provide for the identification of ownership, the eggs are packed, as collected, by a method known as "The Egg Case Plan," a plan or chart of the interior of the egg case which is carefully marked off as the eggs are packed and each member's registered number in the local association marked on that part of the chart represented the exact location of his eggs in the case.

This chart is tacked into the inside of the cover of the case, so that the eggs when received at the candling station may be candled, graded and credited to the member to whom they belong. When collecting the eggs, the collector gives a receipt on an ordinary counter check, and in shipping the eggs, makes out his invoices from these checks and the egg case plans.

The central candling and grading station located in Charlottetown is a large building with a floor space of more than 12,000 square feet. A staff of fifteen candlers and other trained men under the supervision of an expert manager is employed.

The returns to members are made on a quality basis, the Canadian standards for eggs being the basis, three grades being made which are known as extras, firsts and seconds. Eggs grading below seconds, provided they are wholesome, are sold to the baking and confectionery trades. The system of payment to members is not entirely uniform, and while, as a general rule, members are paid weekly, in some particular instances they are paid monthly. The cash payments made to members constitute a percentage of the value of their shipments, the balances retained being paid periodically.

After the eggs have been candled, graded, and repacked at the central warehouse they are shipped to the leading surrounding markets such as Montreal and other Eastern Canadian cities, a considerable business also being done with the New England States.

The shipments are marketed under the brand of the Central Association, and experience has led these markets to place confidence in the brand. The central association, which is run as a non-profit concern, merely acts as a marketing medium for its members, but to meet general expenses and salaries, a portion of the value of eggs handled is withheld from payments made to members, and at a stated date, once a year, all accounts are balanced, members being credited with any amounts that may be due to them as a result of the year's business.

The amount available for distribution at the end of 1919 was \$47,000, forty per cent of which was distributed to the members, the balance being retained as working capital, and capital stock issued for this remaining sixty per cent. The business details of local circles are arranged at local meetings and, once a year, an annual meeting of delegates representing all the units in the federation is held in Charlottetown.

With a view to improving the poultry stock in the country, the organization distributes day-old chicks from approved breeding stock and, in 1919, seventeen thousand chicks were distributed among members, these chicks being hatched at the central hatchery of the Association in Charlottetown from eggs produced by government inspected pure bred flocks.

Another valuable service now being rendered to producers by this association is the operating of a poultry killing station during two periods of the year, first in August, when hens and broilers are handled, and again from November until Christmas, when large quantities of cockerels are killed and marketed. It is hoped to extend this department of the business.

SHORT COURSES AND EXTENSION SCHOOLS

HOW ORGANIZED AND CONDUCTED

Information as to the System Followed in a Number of Provinces in Carrying on this Form of Work

ONTARIO'S SHORT COURSES IN AGRICULTURE

BY R. S. DUNCAN, B.S.A., DIRECTOR OF AGRICULTURAL REPRESENTATIVES

COURSES in practical agriculture conducted during the winter months have become quite a feature of Agricultural Representative work. These courses are intended primarily for farm boys from sixteen to thirty years of age, and are held at different points in each county each year and last from four to six weeks.

The courses in the western portion of the province—from Durham and Victoria and West,—commenced on January 4, whereas, those in the East did not commence until January 25, the week following the Ottawa Winter Fair.

The department supplied an assistant, either a graduate or an undergraduate of the Ontario Agricultural College, between two counties, whose time was divided equally in lecturing on the same subjects at each class. In addition to such assistance, the Representatives were given further help in the so-called "Special Lecturers" for such subjects as veterinary science, live stock, poultry, fruit and vegetable growing, bee-keeping, seeds, soils and drainage, plant diseases, farm management, marketing and co-operation, and farm power. Specialists in each of the above subjects were eagerly listened to, not only by those who were considered among the regularly enrolled students, but by farmers and others in the locality where the courses were held.

The work at headquarters consisted in organizing the classes on a fairly uniform basis, securing assistants, arranging for special lecturers, obtaining dem-

onstration material, and planning a reception and entertainment for some of the classes when they visited Toronto towards the conclusion of the courses.

The local organization is left entirely in the hands of the Agricultural Representatives. They naturally secure the co-operation of the township, village or town councils in whose municipality the courses are held, which body invariably supplies a hall, free, in which to conduct the classes. All local organizations connected with the agricultural community are asked to assist in making the course a success. Meetings are held, committees are appointed, calendars and advertising matter are sent out to bring the matter to the attention of the local people—"The farm boys' opportunity."

The courses are made as practical as possible. The lectures are supplemented by demonstrations and are varied in each county to suit the special needs of the locality. The following is taken at random from one of the calendars as issued and is a fairly comprehensive outline of the courses as a whole:—

Live Stock.—A study of the types and characteristics of the different breeds of farm animals. Visits will be made to local stock farms where practical work will be taken in judging cattle, horses, sheep and swine.

Feeds and Feeding.—A study of the feeding value of foodstuffs used on the farm; their adaptability to different classes of stock; the working out of balanced rations; care and management of farm animals.

Field Crops.—A study of the principal field crops of the county with practice in judging seeds of all kinds; principles of crop improvement; rotation of crops; the results of experimental work at Guelph and Ottawa.

Dairying.—Feeding, care and management of dairy cows; improvement of the dairy herd; care and handling of milk and cream; practical work in testing milk and cream; the process of butter-making.

Poultry.—Characteristics of the most useful breeds of farm poultry; feeding and general management; poultry houses; egg production and rearing of young chickens naturally and artificially.

Agricultural Botany.—Identification and eradication of weeds and weed seeds; the Seed Control Act and its application; plant structures; the relation of plants to soil, air, light, temperature and moisture.

Insects and Fungous Diseases.—Study of injurious insects of orchard, garden and field; their habits and injuries; best method of prevention. Study of fungous diseases of farm crops; rusts, smuts, blights, rots and scabs.

Sprays and Spraying.—The preparation and application of sprays and solutions for treatment of seed; spraying machinery.

Soils.—Study of the origin of soils; different types of soil; essential constituents, soils in relation to moisture, air, heat; methods of cultivation; the principles of tile drainage; methods of putting in a system of drains; benefits to be derived from drainage.

Manures and Fertilizers.—Care and application of barnyard manure; commercial fertilizers, their nature and use.

Fruit and Vegetable Growing.—The fruits suited to the district; methods of propagation, planting, pruning, cultivation, care; practical lessons in grafting and pruning; the farmers' vegetable garden; hot beds; canning crops.

Bacteriology.—The study of bacteria in relation to agriculture; plant and animal disease and sanitation; bacteria in the soil, in milk, in silage, etc.

Farm Book-keeping.—Farm records and accounts.

Marketing and Co-operation.—The value of proper preparation and packing of farm products; how to co-operate in marketing and its value to the farmer.

Lectures and practical work are given from 9 a.m. to 4 p.m. each week day, except Saturday. Practical work is given in the testing of milk and cream, in pruning bush and tree fruits, identification of weeds and weed seeds, shearing sheep and the grading of wool, judging of grain, clover seeds, roots, potatoes, corn and vegetables, and the judging of all classes of live stock.

A Literary Society is formed for the purpose of developing latent talent. Debates are held, impromptu speeches are given, and an opportunity is given each member of the class to get practice in the art of public speaking.

The classes conducted in counties close to and adjoining York county have visited Toronto, where they had the privilege of inspecting the Union Stock Yards, the Packing Plants or Abattoirs, Parliament Buildings, Massey-Harris Co., University buildings, and one of the large dairy plants. During the month of January, nine Agricultural Representatives brought their class to the city and over 300 farm boys made a tour of inspection of some of the more important institutions and plants.

The attendance of farm boys at the courses this winter, particularly in Western Ontario, has never been better. Of the twenty-five courses which were concluded by the end of January, there was an average attendance of twenty-seven—the lowest being ten and the highest seventy-one. During the past ten years 311 courses in practical agriculture were conducted by the Agricultural Representatives with a total attendance of 7,225 farm boys, or an average for each course each year of twenty-three.

NOVA SCOTIA SHORT COURSES

BY DR. M. CUMMING, PRINCIPAL,
AGRICULTURAL COLLEGE, TRURO

AS there is not a large staff in the Nova Scotia Department of Agriculture, we have to arrange so as to fit in with the duties of the members of the college staff who have, up to the present time, given most of the instruction at the short courses, and our plans have been considerably modified due to this consideration.

Our usual procedure is to hold a short course of from two to three days' duration, occasionally more. Until three years ago, when duties growing out of the war made it impossible for the members of our staff to give the necessary time, we were in the habit of conducting from six to eight short courses at various points in the province. The procedure was to draw up a complete programme and print same, and then to send a representative from the college staff to the community where the short course was to be held several days in advance and get him to make all necessary arrangements in connection with securing a building, live stock and equipment necessary to make the course successful. Very fortunately, in seven counties of the province, buildings have been constructed since the year 1911 with special reference to affording the necessary accommodation for short courses, and this has materially facilitated our programme. In this connection I may state that if our department were in a position to assist rural communities in the further establishment of community halls, I should like to have the plans for these of such a character as to lend themselves to the purpose of conducting short courses. The most satisfactory building I have ever seen for this purpose is the so-called Demonstration Building at Lawrencetown, Nova Scotia, an account of which appeared in the January-February issue of *The Agricultural Gazette*.

We have always advertised the short course two or more weeks in advance in the local press and by means of circulars, and ever since they have been established have had an average enrolment in every class of considerably over 100. I may further add that, despite all the arrangements that may be made by the departmental officials, our courses have seldom proved a success unless a live group of local men took personal interest in the matter and devoted their energies to working up an attendance.

THE NEW BRUNSWICK SYSTEM

O. C. HICKS, B.S.A., INSTRUCTOR OF SOILS
AND CROPS

In this province short courses are carried on through funds provided by the Dominion Agricultural Instruction Act, and are organized and directed by an official of the Department of Agriculture.

The young men's courses of two weeks' duration are held simultaneously at local centres in different counties, organized and directed by the local Agricultural Representative who has the assistance of members of the staff of the department. Each instructor carries a travelling equipment of demonstration and illustration material from one school to another. Stereopticons are provided for each Representative's office, and each division of the department has an assortment of slides pertaining to its work. In the French-speaking districts instructors who speak in French are provided.

The places of meeting are the halls which form a part of the Agricultural Representative quarters, or a suitable building placed at the disposal of the Department by an agricultural society. The provision made for demonstrating on live-stock is to convey the students to a nearby stock farm judging and discussion takes place out of doors.

The courses are general in character as at none of the centres is agriculture so specialized that any special need

exists. The daily sessions are for class work only and are divided into two morning and afternoon periods, all periods on any one day being devoted to one branch of agriculture. To sustain interest in the animal husbandry part of the course, a judging contest between teams of three students representing each school was promised. The contest was held at the Dominion Experimental Farm at Nappan in July, the travelling expenses of the contestants being paid by the department.

A special school or course of instruction for young men in dairying is conducted in affiliation with the departments of agriculture of Nova Scotia and Prince Edward Island at the Agricultural College, Truro, N.S.

An Apple Packing School organized at a fruit-growing centre by the horticulturist was well attended by enthusiastic growers.

Short courses in Household Science are conducted by the Women's Institute Division in both English and French-speaking districts of the province. Classes in Cookery, Sewing, Millinery, and Nursing are held daily in centres convenient to rural and village residents.

EXTENSION SCHOOLS IN MANITOBA

BY S. T. NEWTON, SUPERINTENDENT,
EXTENSION SERVICE

Several different kinds of extension schools are carried on in Manitoba, namely, Gas Engine, Live Stock, Field Crops, Dairying, Poultry Raising, Dress-making, Millinery and Cookery. Of these the greatest demand is for Gas Engines, Dressmaking and Millinery.

During the winter months one member of the extension staff, usually the assistant superintendent, devotes practically all his time to the direction of the short courses. The plan followed in making up the list of short courses to be held during the following winter is, first, to

have the extension man in charge of each short course this year to make careful enquiries during the time he is there as to the needs of the district on the following year, and then make recommendations as to the kind of course that will likely prove of most service. Second, immediately after the course is held a letter is sent to the local committee asking their opinion as to the advisability of booking them for a short course during the following season. Third, circular letters outlining proposed courses are sent to each of the 250 rural organizations with which the extension service is in close touch. In the fall the full schedule is mimeographed and copies are sent to each secretary, to make sure that during the summer conditions have not arisen to make the holding of a course inadvisable, and to enable the local committee to get in touch with other local organizations and see that the dates do not conflict with local events. The local committee is encouraged to do as much advertising as possible, but it has been found that if posters and other advertising matter is not sent out in good time from the extension office, the advertising will be delayed too long to ensure success.

Bulletins are sent out on the subjects taken at the short courses for each member of the class, so that they will be available as soon as the class opens.

As a general rule each course extends over a period of five days. Much better results would be obtained in the case of the gas engine courses if they continued for two weeks.

For the gas engine courses, the local committee is expected to provide several small stationary engines of different makes, at least two tractors, a two-cylinder and a four-cylinder, and as many engine parts as can be conveniently gathered. The local committee also provides a good, roomy, heated garage, and a lecture room. The lecturers take with them engine parts such as magnetos, carburetors, charts, and lantern slides.

For Dressmaking, those who attend the classes provide all the materials required, including patterns. For millinery, it is necessary for the instructors to take with them a good supply of all kinds of millinery supplies, as this material can rarely be obtained locally. The material used is paid for by those making hats, at regular wholesale prices plus a small percentage added to cover express, shrinkage, etc.

Local Organizations Assist

In organizing an extension school, the initiative is usually taken by a local organization such as the Agricultural Society, Women's Institute, U.F.M., etc. Whatever organization takes the lead is encouraged to co-operate with all other local organizations, and a management committee is formed with representatives from each, and this committee takes full charge of all local arrangements, collects whatever fees are needed to defray expenses—for gas engines, from \$1.50 to \$2, and for dressmaking and millinery about 25 cents each.

For the Gas Engine courses three instructors are provided if the enrolment is 50 or over. For the agricultural courses two lecturers are generally arranged for, and in the case of the home economics classes, if the enrolment is over 25, the class is divided and one half comes on the first week of the course, and the other half on the second week.

Combination courses such as Gas Engine and Live Stock, or Dressmaking and Millinery, have not been found satisfactory, as the student usually has his mind on one subject and prefers to spend all his time on that subject.

It has not been possible during the past two years to make provision for nearly all the short courses and institute meetings asked for.

SHORT COURSES IN SASKATCHEWAN

BY K. W. GORDON, ASSISTANT, EXTENSION DEPARTMENT, UNIVERSITY OF SASKATCHEWAN

Short courses in rural districts are conducted by the Extension Department of the University of Saskatchewan. The Director of the department has an assistant and several extension lecturers. The latter are not all on the permanent staff. Farmers who have had an agricultural course or who have made a specialty along some definite line of agriculture are used and prove to be splendid men for this kind of work.

The women's work is carried on by a director who works in co-operation with the director of the extension department, and who has a number of trained instructors working with her.

The work in the country is conducted chiefly through the agricultural societies, which are distributed all over the province, and are assisted financially by the Department of Agriculture. Work is also done in co-operation with other rural organizations, such as the Grain Growers' Association, Homemakers' Clubs, Rural Associations, and Community Clubs.

A course is not put on in any locality unless a request is received from some representative organization. Forms are sent out early in the fall to the secretaries of all agricultural societies, showing what courses are available. This simplifies matters, as all the secretary needs to do, after consultation with the directors, is to mark with a cross the subjects that he thinks would meet the needs of the community. He also states an approximate date. Definite dates are set at the Extension Office, and circuits are arranged so as to save unnecessary travelling by the instructors. All details, such as advertising, and arranging for a hall, etc., are left for the secretary of the local society to arrange. Charts,

lantern slides, and moving pictures are used by the instructors.

Most of the agricultural and domestic courses last two or three days. Special two week courses in gas engineering can also be arranged in small towns where proper accommodation can be secured. For this course a nominal fee is charged, but all other courses are free.

EXTENSION SCHOOLS IN BRITISH COLUMBIA

BY F. M. CLEMENT, DEAN, COLLEGE OF
AGRICULTURE

The Extension Schools, as offered by the Faculty of Agriculture of the University of British Columbia, are usually of four days' duration. Invitations for schools are accepted in order of receipt and in no case does the college attempt to offer work that has not been requested by a local organization. It is usually

suggested that a local committee be formed, representing various associations and official bodies. This committee is made responsible for rent of hall, light, heat, advertising and such other matters as must be attended to locally. The committee is also responsible for a satisfactory attendance.

The programme is prepared at the college, but is ordinarily printed locally. While the subjects are of a general agricultural nature, local problems are dealt with to as great a degree as possible. For instance, in the small fruit sections, emphasis is laid on small fruits, and in the dairy sections emphasis is laid on dairying. The college assumes all responsibility for cash outlay, but the local committee is asked to assume the general responsibility for the success of the course.

Last year eight extension schools were offered, and the average attendance was sixty.

THE NATIONAL CONVENTION OF FEDERATED WOMEN'S INSTITUTES

BY ELIZABETH BAILEY PRICE

THE words "Edmonton in June" should have a significance to every Institute member in Canada, for at that time and place the second biennial convention of the Federated Women's Institutes of Canada will be held. To be exact, this important gathering—it is expected to be the largest of its kind ever assembled in Canada—will take place during the week of June 25-30, and will be followed by the Alberta convention of Women's Institutes and Girls' Clubs.

The convention committee announces that for the purposes of the convention they have secured the use of the Convocation hall of the University of Alberta, and that accommodation may be obtained at the university residences at

the rate of two dollars per day—this to include room and meals.

One of the features of the convention will be an exhibition of handicrafts. Already a great deal of attention has been directed to these by the Women's Institutes and, in British Columbia particularly, there has been a revival of spinning and weaving.

As the personnel of the national executive includes women of national and international importance, a very fine programme may be anticipated. All the vital problems will be discussed by exceptionally good speakers. Every Women's Institute member in Canada is invited to attend. Those who live in the East will be cordially welcomed to

the West. No feature of education and entertainment will be overlooked.

National Pins

The pins of the Federated Women's Institute are now ready and may be obtained from the provincial superintendents. Any member of any Women's Institute of Canada is entitled to wear one. These pins have as their design the Canadian coat of arms, and are most attractive.

Help for Soldier Settlers' Wives

All through the western provinces the Women's Institutes have been a very helpful factor in promoting the short course for the wives of the soldier settlers. This course of instruction which

is given under the auspices of the Home branch of the Soldier Settlement Board, is made possible by the co-operation received from the various universities, the schools and colleges of agriculture, and the departments of public health. The courses include demonstrations in butter-making, home nursing, poultry work, gardening, sewing, laundry work, bread-making, foods, canning, milk dishes, pastry, and community work for women. The Edmonton Women's Institute took charge of the billeting of four hundred women and children; the Peace River Women's Institute is arranging for the billeting of fifty, Red Deer took care of some ninety, while the Institute at Calgary is co-operating with other societies to help with a similar course to be held in that city in June.

AGRICULTURAL SHORT COURSES, 1921

COURSES AT THE NOVA SCOTIA AGRICULTURAL COLLEGE

THERE were ninety students in attendance at the Men's Short Course and twenty-eight in the Women's Short Course in the Nova Scotia Agricultural College, Truro, from January 4 to 14. The attendance was smaller than in former years, but the courses themselves were unusually good and were much appreciated by those who took advantage of them. The Women's Short Course in Home Economics and related subjects was the first of its kind held at the institute, and proved both interesting and profitable to those in attendance.

Agricultural Motion Pictures

One of the most effective as well as attractive features of this year's short course was the exhibition in the evenings of agricultural films taken in Nova

Scotia during last summer. In the preparation of these the college joined hands with the Dominion Atlantic Railway.

One of the films, on the grading of cream, under the title of "Mr. Sweet Cream and Mr. Lumpy Sour," attracted so much attention that the Government of Saskatchewan wired the Secretary for Agriculture asking permission to purchase a duplicate film.

Other films were on the grading and selling of wool co-operatively, poultry production, and the growing of O.P.V. (oats, peas, and vetches), and sunflower for silage purposes. The last mentioned shows the whole process from the ploughing of the land, through seeding, harvesting, and ensiling, until it is fed to the cattle. Two more films are now almost ready and will be shown at farmers' meetings during the winter. These are on cow testing and turnip growing.

Last year the department made use of films taken in other parts of the world,

and they were very good indeed. Yet all agree that local films, illustrating farming conditions in the province, are not only more interesting but also of greater educational value. The films taken by the college people, along with those taken by the Dominion Atlantic Railway, make up a fine movie library. They will be shown not only all over Nova Scotia this winter, but also in Great Britain, for the purpose of attracting immigration to this end of the Dominion.

COURSE IN HOME ECONOMICS

BY MISS HELEN MACDOUGALL, SUPERINTENDENT OF WOMEN'S INSTITUTES, TRURO, NOVA SCOTIA

A most successful short course in Home Economics was held at the Agricultural College, Truro, from January 5 to 14, 1921. The subjects offered were: Dairying, Gardening, Poultry-keeping, Home Nursing, Dressmaking, Basketry, Millinery, Foods and Cookery, Household Management, and Canning. The instructors in the various classes handled their subjects with skill, and the lectures throughout were helpful and practical. There was an enrolment of thirty-two students from various parts of the province.

The plan of serving dinner and supper at the college was most successful, as in addition to the added comfort and convenience, a spirit of friendliness and good fellowship was created, which added greatly to the pleasure of the course.

On the closing day the students had a display of their work, the exhibits including garments and millinery made in class; also examples of dainty basket-work. Work of this kind had not been included heretofore in the short courses, and all felt greatly pleased with the exceptionally high quality of the exhibits.

The entertainment given by the Women's Institute on the last night of the course was much appreciated by all the students. The course was a decided success from beginning to end, and all

who attended felt that they had benefited by the information and instruction they had received.

PRINCE EDWARD ISLAND SHORT COURSES

A general agricultural short course was held in connection with the new Technical and Agricultural School at Charlottetown from January 4 to 14. During the morning session, a course of instruction in field crops and the judging of grain was conducted by Mr. J. A. Clark, Superintendent of the Experimental Farm, assisted by Mr. Frank Tinney, Assistant Superintendent, Mr. S. J. Moore, Truro, N. S., and Mr. A. F. Hansuld of the Provincial Department. Lectures on various phases of Agriculture were given by Mr. James D. Thompson, Expert Wool Grader, Dominion Live Stock Branch; Mr. J. K. King, Representative of the Live Stock Branch, on co-operative shipping and selling of live stock; Mr. C. J. Cook, Kensington, on Dairy Record Centres; Mr. Cyrus Poirier, Representative Dominion Poultry Branch, Charlottetown, and others.

During the afternoon session, regular classes were conducted on the judging and care of live stock by Mr. W. J. Reid of the Provincial Department assisted by Mr. J. E. Rettie, Manager Guelph Winter Fair and Hon. Walter M. Lea, Commissioner of Agriculture. Classes on Motor Mechanics were conducted by Mr. Harry Whitlock assisted by Mr. Angus Lavie, both of the Technical and Agricultural School Staff. A number of classes were also conducted during the afternoon by Mr. Fraser T. Morrow, Provincial Dairy Instructor, on milk and cream testing.

A number of evening sessions were held at which lectures were given on various phases of live stock by one or more of the live stock men present; also on plant diseases by Mr. S. G. Peppin of the Pathological Laboratory, Charlottetown, on fertilizers by Mr. C. M. Williams of the Soldier Settlement Board, Charlottetown, on growing seed potatoes

by Mr. W. Boulter, Provincial Department of Agriculture, and farm management by the Hon. W. M. Lea.

There was an average attendance of forty-five students at all classes held, and the interest maintained throughout the

course was one of a very genuine nature. On the last evening a short programme of local talent was given by way of entertainment, after which refreshments were served.

LECTURE COURSES FOR SOLDIER SETTLERS' WIVES

BY MRS. J. MULDREW, DIRECTOR HOME BRANCH, THE SOLDIER SETTLEMENT BOARD,
OTTAWA

IN Ontario, three lecture courses have been held under the auspices of the Soldier Settlement Board for soldier settlers' wives—one at New Liskeard in Northern Ontario, one at Simcoe in Western Ontario, and a third at Ottawa.

In reference to the details for these I may say that we pay for the billets from the Training funds of the Soldier Settlement Board. The educational work is done partly by the members of our Home Branch, and partly by outside assistance. In Ottawa, for instance, the Federal Department of Agriculture took charge of two whole days, with lectures at the Experimental Farm, while the Technical School provided lectures in cooking, and the Victorian Order of Nurses undertook the lectures in nursing.

At Simcoe, Ontario, the Home Branch gave the lectures in cooking and canning. The extension department of the Ontario Women's Institutes supplied a lecturer in sewing, and we were able to take advantage of the annual short courses being held by the Women's Institutes at Simcoe and secure the advantage of lectures in poultry and gardening as well as the moving pictures from the Agricultural Representative.

At Ottawa, the local Red Cross contributed enough to cover the transportation of the women, and the Ottawa Electric Railway gave free transportation in the city. The assistance that has been so graciously and generously given to us has helped greatly in making the courses a success. Entertainment was provided for the women while in Ottawa

by Knox church, St. Paul's church, the Women's Canadian Club, Catholic Girls' Club, the Y.W.C.A., and by the Regent and Russell theatres. The Day Nursery took charge of all babies during the day, so that the women might attend the lectures.

The following were the topics of the lectures held at the Experimental Farm:—

Horticulture.—Potato growing; small fruits; vegetables in the home garden.

Dairying.—Demonstrations in the handling of milk in farm butter-making and in making soft cheese.

Poultry Keeping.—Poultry keeping in general; breeds of poultry; incubators; poultry feeds; turkeys, geese and ducks; selection of layers for egg-production.

Courses similar to those recently held in Ontario have been arranged in each of the other provinces. In British Columbia a six weeks' course with an enrolment of forty-five students is now being completed. This was held at the University of British Columbia, Vancouver, and is the second course of this duration held in that province. In addition to these, several three-day courses were carried on at different points earlier in the season.

For the province of Alberta five short courses of one week are planned. A very successful one at Edmonton has just been completed. One is now in progress at Red Deer, and others will be held at Grande Prairie, Calgary, Lethbridge and Peace River. Saskatchewan will have a course at each of the following

centres: Regina, Prince Albert, Saskatoon, North Battleford, Wadena, Moose Jaw, Kerrobert. The first course under the auspices of the Home Branch was held in this province last winter, and the success of this form of education demonstrated. In Manitoba, a course is now being held at Dauphin, and complete arrangements have been made for others at Portage la Prairie, Brandon, and at Winnipeg, where an attendance of 350 students is expected. Quebec has had a most successful course at Sherbrooke; and Truro, in Nova Scotia, was the centre of a recent and well-attended course. A six weeks' course was held in Charlottetown last spring at which students from various parts of Prince Edward Island were present. New Brunswick will have several three-day courses in the near future; at these a large attendance is expected.

In each and every centre a great deal of the success in making arrangements, and much of the enthusiasm of the courses has been due to the co-operation and loyal support of organizations which have for their aim the welfare of the returned man and his family.

Transportation for all students was provided by the Red Cross in Nova Scotia, Quebec, Ottawa, Manitoba and Saskatchewan. In Sherbrooke the Red Cross offered their rooms free of charge for a medical and dental clinic the cost of which was defrayed by the Canadian Patriotic Fund, and in other centres the Red Cross arranged for a V.O.N. nurse to be in attendance to give lectures. Provincial departments assisted in supplying instruction and local voluntary organizations arranged entertainments and in every way have helped to make the courses a success.

AGRICULTURAL INSTRUCTION IN PRINCE EDWARD ISLAND

Drainage, Soils, and Crops

The work undertaken in the production of Clover Seed, and for which two Clover Hullers were purchased, has been followed with one demonstration for each machine to prove the efficiency of the machine for the work. The large machine, a No. 2 Birdsell, is giving excellent satisfaction and a programme of work is being arranged for it during the early months of 1921, the idea being to place it in convenient centres where clover has been grown and within reach of a justifiable quantity of the crop.

The drainage operations, although being hindered from making a complete season's work on account of shortage of drain tile, proved to be more satisfactory from a financial point of view than any previous season. It is hoped that with the opening of the next season the department will be in a position to carry on the work without a hindrance of any kind. This will perhaps mean the

operation of the brick and tile plant for at least a time, but it is believed that this can be done with satisfaction to all concerned. The demand for tile draining is not only growing in this Province, but is receiving a more serious consideration in Nova Scotia and especially in New Brunswick, and at present the only plant manufacturing drain tile is the one located in this Province.

Limestone pulverizing operations were conducted as long as possible, but had to be concluded shortly before Christmas on account of the snow making the pulverizing impossible. The undertaking in itself has already justified its inception, and the demand for Limestone has grown to such an extent that the department is considering importing a number of carloads from St. John, N.B. The railway has been solicited to assist in this latter undertaking, and have granted a considerable lowering of the freight tariff for car shipments. They have also granted a tariff on a mileage basis for

shipments from the provincial plant at Bloomfield.

Live Stock and Dairying

A full report of the Dairy Competition is still pending, and will be noted in the next quarterly report.

During the fall months a considerable amount of time was spent purchasing and distributing pure-bred rams, as well as other animals to live stock breeders. The field for such work is being enlarged and made more justifiable by the efforts of the Live Stock Branch in promoting co-operative live stock shipping. The time of the Dairy Instructor has been employed visiting the cheese and butter factories and attending a number of the annual meetings in preparation for the opening of next season's work.

Co-operative Marketing

During the fall months the Potato Growers' Association shipped ten carloads and filled a number of smaller orders for No. 1 Seed Potatoes, the market being chiefly in Long Island and New York State, as well as many points in the Maritime Provinces.

Women's Institutes

The Staff in this department has been reduced by the resignation of the Supervisor, Miss Della E. Saunders, to accept

a position as Demonstrator for MacDonald College, Quebec. The remaining two members have been occupied with attending annual institute meetings and preparing for Short Course work.

Elementary Agricultural Education

The work of the Rural Science Department at the Prince of Wales College has been arranged to occupy half of the time of the instructor engaged for that purpose, the other half being used to conduct classes in farm crops at the Technical and Agricultural School. The greater part of the time of the Agricultural staff has been occupied with teaching at the Technical and Agricultural School, which opened on November 15 with a total enrolment of ninety-nine students. A regular course in practical Agriculture, for which there was an enrolment of twenty-eight students, forms the principal course of instruction. A general agricultural short course and a course for instruction in Cheese and Butter making, are also contemplated. The school has already justified itself in every department, and it is to be hoped that, as the work develops, each department will be more fully equipped and the institution in general placed on a really permanent basis.



PART III

School Agriculture and Related Activities

THE DEVELOPMENT OF AGRICULTURAL EDUCATION IN SECONDARY SCHOOLS

DEPARTMENTS OF AGRICULTURE IN ONTARIO HIGH SCHOOLS

BY DR. J. B. DANDENO, INSPECTOR, ELEMENTARY AGRICULTURAL CLASSES

THE scheme adopted by the Department of Education of Ontario in 1915, was prepared with a view towards providing a kind of education which would likely meet the needs of country people especially. It has been recognized for many years that the scholastic type of education instituted in the secondary schools of the province, though, in many ways the best so far made use of in any of the countries of the world, did not quite fulfil the requirements of those destined to live in the country, either as farmers or semi-farmers. The courses proposed under this scheme were new to the Province of Ontario, and, because of this fact, the people did not realize—nor do they yet realize—the usefulness or practicability of a course of study of this character. Too great an importance has always been attached by the farming communities especially to the preparation of candidates for college matriculation and for teachers' certificates.

Both these obstacles can be overcome only by the education of the public as to the character and value of these courses. And this is naturally a slow process. All educational movements of any real and permanent value are necessarily slow; therefore there is no need for discouragement even if the scheme does not produce spectacular results at the outstart.

The arrangement under which the scheme is to be worked out is given in a pamphlet issued by the Department of Education in 1915, "Recommendations and Regulations for the Establishment, Organization and Management of Agricultural and Household Science Departments in Continuation and High Schools and Collegiate Institutes."

The following quotation from this pamphlet conveys the main idea: "The Agricultural courses, however, established under the *Industrial Education Act*, are managed by Advisory Agricultural Committees and include courses in English, History, Mathematics, Science and Art, suitable for a farming community as well as courses in agriculture and household science. At present not more than these departments can be looked for; but, when the public interests necessitate Agricultural High Schools, they will be duly established and liberally aided by the Government. It must also be borne in mind that the organization of the agricultural and household science departments provided herein is necessarily experimental; after a couple of years such modifications will be made as experience will then justify."

So far, in Ontario only five schools have established departments of agriculture, and experience is now showing that, unless considerable modifications are made in the regular course of study

in High Schools especially—such courses as lead to Matriculation and to the Normal Schools—progress will not be rapid. The few schools referred to above are carrying on, under difficulties, by sheer enthusiasm, industry and zeal on the part of the respective teachers. However, we have gone far enough to show that we are heading in the right direction and that to ensure success we have but to persevere intelligently and patiently.

The chief differences between this scheme and that outlined for High Schools which carry on classes in Agriculture are about as follows:—

Time limitations for special subjects:—

Departments.—For Agriculture (special subjects) two afternoons for the first year and three for the second year;

For Farm Mechanics, one afternoon for each year. No work provided for Middle School.

Classes.—For Agriculture two hours a week for each year of the two years. A two years' course in addition is provided in the Middle School,—three hours per week.

In case of both schemes,—Classes and Departments—the subject is not recognized by any institution as a part of the course leading to admission to that institution. In the case of classes, the subject is a bonus merely.

Of the two plans, the scheme of grants is more liberal to Boards in the case of Departments, but more liberal to teachers in the case of classes. For details with regard to the apportionment of grants, recourse should be had to the Regulations governing the apportionment.

At present there are five schools maintaining Departments and thirty maintaining classes. Of the latter, six schools have classes in the Middle School in addition to those in the Lower School.

THE PORT PERRY HIGH SCHOOL AGRICULTURAL DEPARTMENT

BY THOMAS H. FOLLIICK, M.A., PRINCIPAL

Port Perry is located in the centre of an excellent agricultural district, the townships of Reach, Scugog, and Cartwright, with the southern part of Brock and the northern part of Whitby, making up the area—outside the village of Port Perry—from which our high school attendance is drawn. General mixed farming is conducted throughout the townships, and in several localities stock farming (chiefly purebred cattle) is a very important industry. About two-thirds of the attendance in the school is from the townships, and this fact, coupled with the great inducements held out by the Department of Education, led to the establishment of a department of agriculture in this high school in the fall of 1918.

The Board of Education entered upon the plan with enthusiasm; the village people viewed it favourably, but awaited developments before committing themselves to any stated opinion, and the country people were either indifferent or cautiously favourable. One objection from the parents of the country students which we had to meet was that their boys already knew all about farming, and did not need to take up that kind of work in school. It was not always easy to convince them of the fact that the boy who does the best work at home will obtain most out of the course at school; that farming is already a science to be studied in all its bearings, and that habits of accuracy and thoroughness are formed in the field, the garden, and the farm workshop as much as in the physical or chemical laboratory.

For years past, many farmers have desired to give their children more than a public school education, although they did not wish them to become teachers or to take a university course. The young people would come to high school for a

year, obtain a limited amount of Latin, French, algebra, and art, in addition to the continuation of their public school subjects, and then leave school with nothing to show for their work. Such students we now advise to take the agricultural course: the result being that they remain for two years and use agriculture as a bonus subject on the Lower School examination, or as the equivalent of the first year's work at the Ontario Agricultural College at Guelph. Our time-table also enables those who wish to become teachers to take up all the necessary subjects in addition to agriculture, and so enable themselves to teach agriculture after one summer session at Guelph. As the public are beginning to realize the benefits of such a course, they are giving the work of our department increased support, and those taking the course are growing in numbers and in enthusiasm.

THE AGRICULTURAL DEPARTMENT OF THE HIGH SCHOOL AT OAKVILLE, ONTARIO

BY W. B. WYNHAM, PRINCIPAL

The Agricultural Department of Oakville High School has been in operation for about three years and a half, and while we have not accomplished all that we had planned to do, still we feel that the department has justified its being by the benefit that it has been to the pupils and to the community.

For the first two years we carried out the complete course including Farm Mechanics, but since then we have had to drop the latter owing to increased attendance and lack of assistance. The number of boys taking the regular department course was smaller than expected because of the scarcity of farm help. The number varied from five to twelve, and those who took the work not only enjoyed it but were greatly benefited. Some of these students showed

great interest in the work and have continued it since leaving school by taking up the experiments given out by the Ontario Experimental Union. We now ask all pupils taking agriculture to take as much of the work as possible under the department, as it gives them a wider scope than the ordinary agricultural classes as formerly conducted. We hope soon to revive the work in farm mechanics.

The work of the past year (1920) may be divided under the following heads: Class Work, Home and School Experiments including Home Projects, and School Plots. In the class work we aim to cover the course laid down in the regulations for the departmental examinations with as large a share of experimental work in the laboratory as time will permit.

The home experiments consisted in propagating and growing plants, seed selection, germination and seed tests, testing the dairy cow or herd, and making a plan of the farm for crop rotation. The home projects consisted in growing one vegetable and one flower, with plan of work, notes on care and progress, and results. Some also planned and cared for a whole vegetable garden. For these projects, seeds, fertilizers, and instructions were supplied.

Twenty-eight took up and carried out this work, with splendid results in most cases. The school plots during the first three years were experimental, as well as an effort at production, and were carried out on about three acres of land. We grew beans and potatoes the first year, and with the latter carried out experiments with various kinds of fertilizers. The second year we grew potatoes mainly, and had a few experiments in the production of vegetable seeds. The third year we grew sweet corn. The proceeds from these plots were fairly large, and were devoted to Red Cross and other patriotic work.

During the past year we conducted, mainly, an experimental school garden in which we worked out a variety of experiments in growing vegetables. These were about as follows:—

Corn.—Thinning to three plants to a hill vs. unthinned; cultivated vs. uncultivated (except weeds cut out).

Beans.—In hills, 4-5 seeds to hill, 1 foot apart; in rows, 1 seed every 4 inches.

Tomatoes.—Stake-trained and pruned vs. unstaked and unpruned.

Onions.—From Dutch sets with and without line; from seeds set with and without line; from plants started in hot bed.

Potatoes.—Seed treated with formalin vs. untreated; cut vs. uncut; large vs. small seed; hilled vs. unhilled; deep vs. shallow planting; with and without special fertilizer.

Other vegetables.—Lettuce, radishes, etc., with and without nitrate of soda.

Two pupils shared in carrying out each experiment, and while the dry weather in the early summer interfered with some of these and necessitated replanting or replacing with later season crops, every one profited by the valuable experience gained and the lessons learned.

An opportunity was given to agricultural pupils to profit by lectures and demonstrations in the community. The gardeners' and florists' associations hold their meetings in the assembly hall of the school, and have illustrated lectures once a month, which our pupils attend. Pupils also have taken part in short courses in stock judging. Hot lunches have been introduced for pupils from the country, and pupils have been assisted in every possible way to make the work of the department profitable.

AGRICULTURAL DEPARTMENT AT THE DRAYTON CON- TINUATION SCHOOL

BY G. A. CLARK, PRINCIPAL

Drayton is a village of about 600 population, situated in the centre of a rich agricultural district in Wellington county. It would be difficult to say what class of farming predominates. Dairy products, beef cattle, hogs, eggs, poultry, and honey are the chief products marketed. Large quantities of fibre flax are produced to supply the flax mills at Drayton, Alma, and Arthur. It is not especially noted for fruit production, though, as a rule, there are enough apples for home use.

The people of the community have always been sympathetic toward our school. We began our agricultural classes in 1914, changed to a department of agriculture in 1917, and have no thought of changing back.

We have three teachers spending practically all of their time at high school work. The school is wired and we have hydro-power. We have a good lantern and a moving picture machine. We have access to the films of the Department of Agriculture, Toronto. We have a good reference library in agriculture. Have milk-testing outfits, incubator and other equipment. We have three-fifths of an acre of school garden. This we divide into about fifty plots, each having an area of one square rod. These are given to the students. The student who won first prize last year had to come about five miles. We conduct experiments on spraying, treating potatoes for scab, etc.; also conduct classes in the pruning and grafting of fruit trees. I think nearly every student can test milk for fat. Our work is as practical as we can make it.

In order that students may enter our classes, they must have passed the high school entrance examination, or have

reached at least the fourth grade in public school, and be not less than fifteen years of age. Many of the boys of our classes attend only for one or two years and then go back to farms. Many of the girls train for teachers and go back to take charge of country schools. About 75 per cent of our students are from farm homes.

So far as extension work is concerned, we have a moving picture show one night a week during the winter to give the public an opportunity to see the films of the Department of Agriculture, Toronto. We also have a small spraying outfit for spraying potatoes, which we loan or give demonstrations with in the country. We are trying to make our school the centre for a school fair district. We have supplied the public schools of the locality with seeds and eggs, and they have been taking part in our fair.

AGRICULTURAL DEPARTMENT OF THE HIGH SCHOOL AT BEAMSVILLE, ONTARIO

BY J. G. ADAMS, M.A., PRINCIPAL

The Beamsville High School is situated in the centre of the Niagara fruit belt. It is twenty miles from Hamilton on the West, and twelve and twenty-five miles from St. Catharines and Niagara Falls respectively on the East. It is two miles from lake Ontario, and the southern boundary of the belt is about the same distance away. Beyond the latter, the farming operations are of the mixed type.

The agricultural department of the school was instituted in an attempt to respond to the apparent need for a type of school that would educate the young people farmward rather than cityward. At the time of its inception, the attitude of the people to this particular course was chiefly one of indifference. This may be accounted for largely by the lack of advertising of this new feature.

The course includes instruction in most of the subjects of the first two years of the high school course, Latin and French excluded. In their stead agricultural subjects, including farm mechanics, are taken. The cost of the special equipment necessary and of the special teacher is covered by very substantial government grants. The equipment includes incubators, Babcock testing machines, garden tools, a lantern suitable for slide and projection work, and the common wood-working tools. To this is being added a moving picture outfit.

As a companion course to the agricultural course, a household science course is offered to fit girls for home life. A specialist in the work teaches in a specially fitted room. The equipment includes electrical heating appliances range and hot-plates, and suitable cooking utensils for each pair of girls.

The practical work in these courses is supplemented, during the summer, by work in the school garden for the boys, and by special problems as home projects for both boys and girls. These projects are planned and discussed at school, and supervised by the teacher during the summer vacation.

The requirement for admission to the courses is fourth form, public school standing; high school entrance is not necessary. This is planned to appeal to those rural pupils who have had no intention of going farther than the public school—perhaps because our high schools heretofore offered no courses particularly adapted to their future needs. The agricultural subjects are taught to all pupils of the first two years, only less time is given to the work.

The courses are now being offered for the second year. The first year the response was not encouraging because of lack of advertising. This year the number of students has doubled. Most of the boys are looking forward to courses at the Ontario Agricultural College. Some of the girls look forward to nursing;

others expect to attend Macdonald Institute and return to the home. But the great class of pupils we wish to touch has not responded. We hope to attract those who would otherwise stop attending school after passing the entrance examination, persuading them to come and take two years with us before settling down to farm and home work. To this end, we are undertaking special extension work this winter in the form of a series of lectures. These are to be on agricultural topics, and will be given by professional and practical men. They will be delivered in the school auditorium, and we expect to use this as a means of advertising our special courses.

We have faith in the value of the courses for those for whom they were designed. We have equal faith in the future of the work, and believe that a hearty response will be shown as soon as people are thoroughly cognizant of its value.

AGRICULTURE IN THE HIGH SCHOOLS OF BRITISH COLUMBIA

BY J. W. GIBSON, DIRECTOR OF ELEMENTARY AGRICULTURAL EDUCATION

AT the present time agriculture is taught in ten high schools in the province. The course, which covers two years' work, begins with the second year in high school, and is usually preceded by a course in general science which affords a very suitable introduction to agriculture. Girls as well as boys take the high school work in agriculture. The subject is optional with the other sciences, and equal with them as matriculation subjects. Students taking three science subjects, one of which may be agriculture, are required to take only one foreign language for junior matriculation. The same standing admits to Normal school. Those students who complete the Normal school course who have taken the agricultural option in high school are

granted a special rural science diploma—the equivalent to the diploma issued by the department to teachers devoting their full time to rural science for at least two summer sessions. As in most of the provinces, this diploma entitles teachers to a special bonus in recognition of work accomplished in the teaching of elementary agriculture. We already have a few of these young men and women teaching in our public schools, and there is every reason to believe that they will do more efficient work along agricultural lines than will most of the teachers who have not had this special preparation.

In every case instruction in agriculture in high schools is in charge of agricultural graduates who have also had teaching experience. The direct method of instruction through laboratory, garden and farm excursion is followed, the agricultural text-book idea being practically eliminated. In some cases special garden houses in addition to the regular agricultural laboratory-class room have been provided and in one case a greenhouse has been provided.

The high school agricultural course is growing in popularity amongst the girls as well as the boys. It is of recognized advantage practically as well as educationally. It seems to meet to a degree the needs of those communities and those high schools where it has been in operation. It appeals to boys and girls who have some first-hand knowledge of rural things, and also to those on the other hand who wish they had. It appeals to boys, particularly, who look forward to advanced studies in agriculture in the university and as an evidence of their interest in the subject as well as of the thoroughness of the instruction given in it, all of the students who wrote on the matriculation examinations last June were successful and many of them made very excellent records. We hope to include a few additional high schools in our agricultural programme during the present year.

THE AGRICULTURAL COURSE AT CLOVERDALE, B.C.

BY R. H. L. GIRLING, PRINCIPAL

Surrey High School is situated in the village of Cloverdale, and is the centre of a prosperous farming community in the lower Fraser valley. Dairying on the large holdings, and poultry keeping, with small fruits, on small acreages, are the branches of farming most highly developed.

Naturally our high school is patronized by students from farm homes or rural villages, and it is felt that such a school should serve the community by giving instruction in the science of agriculture. A number of farm boys attend high school a year or so before returning to the soil; while many other students hope to become teachers and instruct farm boys and girls. Both these classes find the course in agriculture particularly useful.

The course was introduced in 1916 through the co-operative efforts of local institutions such as the farmers' and women's institutes and the rural science branch of the Department of Education. The Department of Education pays the salary of the instructor, while the school board is held responsible for scientific equipment, office expenses and transportation.

E. L. Small, B.S.A., a graduate of the Ontario Agricultural College, with teaching experience, has had charge of the work since its inception. His duties not only include instruction in high school agriculture, but the supervision of nature study, elementary agricultural teaching, and school and home garden work in all the public schools in the municipality.

As a high school subject, agriculture is a two-year course, starting with the second year in high school. It is one of the three optional science subjects necessary for matriculation standing. At least three hours per week is devoted to the subject. A large percentage of the students attending the Surrey High

School enroll in the course. This I consider shows a sympathetic feeling for the work on the part of the ratepayer.

An agricultural class-room was equipped with tables, sinks, cupboards, etc., and electric fixtures were installed for night classes. Soil tubes, milk tester, fanning-mill, drainage level, microscope, pruning tools, and tools necessary for experimental gardening were secured. No text is used by the students, and all work is as practical as possible. Fifty per cent of the final examinations is allowed for practical work. Owing to the extremely heavy clay, the experimental school plots have not been developed as had been expected, and for this reason more stress has been placed upon home project and garden work. During the spring term, the best poultry, dairy and general farms are visited by the class for a first-hand study.

AGRICULTURE IN THE VERNON SCHOOLS

BY V. BYRON ROBINSON, B.S.A., DISTRICT
SUPERVISOR OF AGRICULTURAL INSTRUCTION

The building used as a high school in Vernon is so over-crowded that no room was available for an agricultural class room; hence a room was secured in the court house. This is a large modern building affording excellent class room facilities. The high school is situated but a few hundred yards from the court house so that the pupils are put to very little inconvenience in going from the one building to the other.

The agricultural lands of the Vernon district are for the most part devoted to orchards, and fruit growing is the important industry of the locality. Dairying and vegetable growing are carried on to a limited degree, but are bound to become of more importance in the near future.

Origin of the Work

Considerable propaganda was necessary before the people of Vernon wished to undertake agricultural instruction

through their schools. The Director of Elementary Agricultural Education for the province made several trips to Vernon for the purpose of interesting the school board and the ratepayers in the movement. His first visits were made about 1912, and it was not until 1917 that an instructor was sent to Vernon. The instructional work of the local horticultural branch of the Department of Agriculture did much towards showing that agricultural instruction could be made practical. Credit is also due the various local agricultural societies for the stand they took in the matter.

Staff, Equipment, and Course of Study

The agricultural work is taught by an employee of the Department of Education for the province. This instructor is loaned to the city, which is required to meet his travelling expenses and to equip and maintain a suitable class-room and laboratory. This includes not only laboratory and class-room materials but the necessary tools for conducting the two school gardens of the city.

The course of study followed is that outlined by the Department of Education for use in the schools of British Columbia.

Methods of Instruction

This course is so constituted that it permits of a division of the required work into monthly allotments. At this school one topic per month is dealt with and at the end of that period an examination paper is set on the subject. Two three-quarter hour periods two days per week are devoted to agricultural work. The time is divided in two portions, one being used for lecture work and the other for a laboratory period. An occasional laboratory period is utilized for trips to local points of interest such as fruit ranches, the packing houses, dairy farms and the creameries. Each student provides himself with a duplicating note book. All laboratory exercises are entered in this, one copy being retained by the student and one being

passed in to the instructor. Credit is given for this work.

Each student of the agricultural class is required to carry on a project as supplementary to the class room work. One may choose a project in which he is directly interested and from which he hopes to derive a cash benefit. This project involves practical work which is carried on over a period corresponding to one growing season. In addition to the practical work of the project each student is supposed to complete a certain amount of study directly bearing on the project. Provincial bulletins, Dominion bulletins, and American bulletins are used as texts for this work. It is hoped that arrangements can be made with such institutions as the University of California and the Kansas Agricultural College, whereby students may enroll with one of these institutions for a correspondence course dealing with their project. The outline given below of a project designed for a student interested in raising Black Siberian Rabbits will serve as a concrete example of the project work.

No requirements are set for entrance to the first year agricultural class. Students who take agriculture have to take but one language during their second year high school work. Admission to the second year agricultural class is gained by the successful completion of the first year's work.

At present there are twelve members in the first year agricultural class, this being about fifty per cent of the enrolment for the second year high school work. Next year, when both first and second year agricultural classes will be in operation, there will be an attendance of about thirty.

The majority of the students are from the fruit ranches surrounding the city and will in the course of time assume an active control in the management of their home ranch. Three of the members plan on pursuing their work through an university course and later entering the field of technical agriculture.

Local Extension Work

Arrangements have been made between the Department of Education and the Department of Agriculture whereby the District Supervisor devotes one half of his time to Department of Agriculture duties, acting as the Agricultural Representative for the district.

In addition to this work, considerable time is devoted to aiding the rural teachers of the district with their nature study and agricultural teaching. A circulating library of texts and bulletins dealing with nature study and agriculture has been formed and has proven its worth as an aid to rural teachers. Printed lesson forms and nature study projects are prepared every so often and sent to the rural schools of the surrounding country. A special lecture course for teachers of the city schools interested in nature study, was presented the first half of this term. The local department of agriculture officials co-operated to make this course a success. The lectures are being continued this present term.

PROJECT IN RABBIT REARING

Outline of the work by months:—

March.—Construction of hutches. Purchasing of stock. Study of Breeds and Hutches, based on various bulletins. An essay on the above.

April.—Experiments in the cost of feeding started. Study of feeding methods as described in the bulletins. A written essay based on the study for the month.

May.—Feeding experiments continued. An experiment in cross-breeding started. A study of the care of the breeding doe, as outlined in the reference bulletins. An essay based on the study for the month.

June.—Feeding and breeding experiments continued. A study of the care of the young as outlined in the reference bulletins for the course. An essay based on the study for the month.

July.—Feeding and Breeding experiments continued. Preparation of stock for market. A study of the preparation of stock for market as outlined in the reference bulletins. An essay based on the above study.

August.—Feeding and Breeding experiments continued. Preparation of stock for exhibition. A study of the preparation of stock for exhibition as outlined in the reference bulletins. An essay dealing with the study for the month. An essay giving the results of the feeding experiment. An essay giving the results of the breeding experiment.

HIGH SCHOOL AGRICULTURE AT ENDERBY, B.C.

BY J. B. MUNRO, B.S.A., DISTRICT SUPERVISOR OF AGRICULTURAL INSTRUCTION

The course in Agriculture and General Science in the Enderby High School is conducted in accordance with the regulations of the Department of Education. The present system has been in operation since 1916, when a district supervisor of agricultural instruction was appointed to supervise the teaching of agriculture in the schools of Armstrong and Enderby.

Enderby is the commercial centre of a mixed farming district in the northern part of the Okanagan valley; consequently the practical teaching deals with general farm practice, and local problems are given prime consideration.

There are twenty-seven pupils enrolled in the courses, some of whom are taking agriculture as a subject preparatory to an agricultural course at the University of British Columbia. Others, whose objective is a teacher's certificate, realize that a knowledge of agricultural science is a necessary part of a successful teacher's equipment, and for that reason choose this option. The majority of our students, however, are taking agriculture because they are the sons or daughters of farmers, and after a few terms at

the high school they must return to the farm.

For the benefit of the latter class, the work outlined in our syllabus is so taken up that it will give the greatest assistance in the solving of practical farm problems. At the same time those striving for matriculation standing are not neglected. The present arrangement, whereby General Science is taken in the first year of high school, makes it possible to give the boy whose schooling must shortly terminate a valuable insight into the principles underlying proper agricultural methods. The general science course is broad, giving plenty of latitude to the instructor who arranges the work to suit the requirements of the class.

The garden in connection with the Enderby school has an area of one acre. Part of this has been utilized as a miniature experimental farm. Variety tests and tests with fertilizers have been conducted, and the results were given to the public through the local press. The main project work carried on has been with poultry, very successful results being secured. At present arrangements are under way for the holding of a fall school fair at which the products of home and school gardens will be shown.

AGRICULTURAL INSTRUCTION IN THE HIGH SCHOOL AT ARMSTRONG, B.C.

BY L. C. STUDDERT KENNEDY, PRINCIPAL

SITUATED as Armstrong is in the midst of an excellent agricultural district at the northern end of the famous Okanagan Valley, the trustees of the school saw very clearly that the curriculum of the high school would be very greatly improved and a need of the district would be met by the establishment of a course in the Science of Agriculture.

With this in view an agricultural building has been erected on the school

grounds; ample provision has been made for school gardens and for the practical demonstration of the known facts of the science of agriculture, in relation to soil values and the treatment of soils; the large and well-equipped laboratory of the school has been placed at the disposal of the Supervisor of Agricultural Instruction for the district and every facility is being given to what is now regarded as a very excellent and essential addition to the curriculum of this high school.

The agricultural course is wide and liberal, and many pupils are found to be taking a very real interest in the agricultural work, who find it hard to manifest much interest in many branches of the ordinary subjects of their school work. Their work in agriculture seems to arrest their attention, it seems to appeal to a something within them which arouses their interest, and this interest is being very clearly manifested by the number of pupils producing really good work in the subject.

In this connection I should like to mention, in particular, the work that is being done in Entomology. This work has, for quite a number of young people, a very real interest, and both in this province and in the province of Manitoba I have seen really good results coming from the study of this subject.

Their studies in agriculture enable the pupils to see more clearly the many excellent features of the animal kingdom and, as a result of this knowledge, they obtain a much greater appreciation of the work for good that is being done all the time by animals, both great and small. As a result of this knowledge, a seemingly natural tendency to the wanton destruction of and cruelty to small animal life can be practically eradicated from the daily conduct of many boys. This is accomplishment and is, therefore, one of the greatest recommendations for the value of the subject.

The investigations conducted relative to the proper treatment of soils should be of value in that there is a great

variety of soils in this district, and a better understanding of the least costly and at the same time demonstrably scientific method of treating soils, should, in time, aid production.

There was, this year, a much greater interest shown by the pupils of the high school in the judging of cattle at our local fair, and we can see how, in time, this agricultural course will arouse a clearer understanding and appreciation of the main work of the district, viz., agricultural production—which is the most essential and vital work of the province and of the entire Dominion.

The agricultural course, as forming part of the school curriculum, is still in its infancy, and is, possibly, more than

any other subject, in the experimental stage; but for the few years that it has formed part of the High School course, it has given clear proof of its educational value.

It is a course which certainly has an interest for a number of pupils—it affords them a number of excellent educational experiences that they could not otherwise obtain; it aids in the formation of a sounder attitude of mind toward the actual and essential work of the district in which they live, and at the same time it gives a considerable amount of useful, practical information, which could not be secured by these young people from the study of any other subject in the school curriculum.

AGRICULTURAL TEACHING IN THE PUBLIC SCHOOLS

Systems of Instruction Outlined. The Problem of Successful Application not yet Solved. Some views on Standardization

AGRICULTURE IN THE SCHOOLS OF NOVA SCOTIA

BY L. A. DEWOLFE, DIRECTOR OF RURAL SCIENCE

NOVA Scotia has no definite or compulsory course in Agriculture in the common schools. High School Agriculture is prescribed as an optional in the first year. Even here, it is a book subject rather than a practical one.

Through all our common school grades a certain amount of agriculture is prescribed under the heading "Nature Study." Our teachers, however, are slaves to the text-book habit; and, consequently, do very little effective work in any branch of nature study. If a definite course were prescribed, a text would doubtless be prescribed to accompany it. That would render the whole course useless; for the teacher in nearly every case would assign book lessons and "hear" them.

Though "Nature" lessons are prescribed, we have no method to enforce

their being taught. As a matter of fact, they are not taught. Nor will they be taught until we have more efficient training for teachers and some means whereby we may follow up their teaching and compel them to give practical instruction. Unless we have district supervisors—say one for every thirty or forty schools—our work will continue to be inefficient.

The only way to enforce an *attempt* at agricultural teaching will be to place it on the list of examination subjects. That, however, will not insure real teaching. It will simply supply the agricultural language of the text-book. Until children are graded by specially trained supervising teachers on the work actually done and by oral instead of written examinations, our work will not be very valuable or progressive.

To standardize our course is not a solution of the difficulty. Our schools are standardized to death now. Standardization is excellent for a machine but not for a human being. Individuality must be encouraged in any effective school system.

SCHOOL AGRICULTURE IN SASKATCHEWAN

BY FRED W. BATES, B.A., M.SC., DIRECTOR

The problem of elementary agricultural education still awaits complete solution. After many years of trial and experiment and much failure the place of Agriculture as a subject of study in the elementary school is firmly established, but the problem remains to simplify the work so that the average teacher may handle it satisfactorily and efficiently.

Perhaps the most important step in that solution will be the development of a sane and satisfactory course or outline. If all teachers used the nature study method and utilized to the full the environment of the pupils, such a course might not be necessary but under present conditions some guide must be provided. It must be remembered, however, that the most perfect outline of study will not protect the pupil from inefficient teaching.

In formulating the course, the real aim or object in providing instruction in Agriculture must always be kept in mind. The natural development of the child from a lusty young animal into a highly socialized thinking human—not the cramming of young minds with masses of undigested information—must be the ideal, no matter what the subject of study. Agriculture is taught, therefore, because it is a basic industry in civilization, and a proper understanding of our present day social relationships and responsibilities can never be gained without some knowledge of this great factor in human development. Agriculture is world wide, it is older than our

civilization and in some, if not in many of its phases, touches every human life intimately.

The great weakness in agricultural instruction lies not so much in the course as in the teaching of it. The older subjects have been so thoroughly systematized that there is little need for selection: the work being quite clearly defined. In Agriculture the field is so broad, there is so much available material and there are so many avenues of approach, that many teachers, feeling their inability to select and arrange, seize the first book that may come to hand and proceed to lecture and give notes, while others, failing to understand the real aim and purpose of the work, make little or no attempt to carry out the suggestions in the course.

In Saskatchewan, Agriculture has been a subject of study since territorial days. A few years ago a complete revision of the course was made in order to make it more practical and more easily directed. It was felt that the proper method of approach was through Nature Study, hence a Nature Study course was outlined for Grades I to VI. Beginning with simple observations of familiar natural phenomena the pupil is gradually led to a direct study of every phase of his environment. His natural instincts to collect, to roam, to dig in the ground are utilized through excursions, "hikes," making collections, and garden operations. At all stages his interest in other parts of the world is aroused by story and reading so that he comes to know the world as a great hive of human activity, working and delving that there may be a sufficiency of food, shelter and clothing.

In Grades VII and VIII, Agriculture, as a formal subject, is introduced. The mass of information gained during the previous years passes under review and is organized. General principles are discovered, abstract notions developed;

theories formulated and new lines of endeavour undertaken in order to determine whether the experiences of the past have been correctly interpreted or not.

For convenience the course is divided into sections as follows:—

Plant Life.—Parts of Plants, Food, Seed, Germination and Classes.

Weeds.—Noxious Weeds Act, Recognition, Methods of eradication.

Crop Production.—Farm and Garden Crops, Seeding, Cultivation, Harvesting, Rotation.

The Soil.—Formation, Character and Types, Preparation for Crops, Conservation of Moisture and Fertility.

Farm Implements.—Farm operations, Labour, Mixed farming, Record keeping, Marketing, Storage, Home planning.

It will be readily seen that this course cannot be treated exhaustively. The aim is to provide a guide in organizing the first-hand information already gained by the pupil and to correct those points where through faulty observation or careless thinking, inaccurate ideas have been formed. It is believed that when properly conducted this course will bring the child to a sympathetic and intelligent understanding of the greatest of all industries—Agriculture.

While there has been marked improvement in the treatment of this subject in the schools, the situation is far from satisfactory. The difficulties and weaknesses, already noted, are all too prevalent in Saskatchewan. To assist the teachers in the field, lectures and discussions are held at conventions and institutes, special courses in Agriculture are conducted at the Summer School for Teachers and general aid given through correspondence and personal direction. Special instruction is provided for the teachers in training at the Normal Schools, but as the time allotted is not sufficient in which to cover the whole

field, effort is concentrated on methods and in developing a sympathetic attitude to the work.

Up to the present no text book in Agriculture has been provided. It was thought better not to have the work attempted at all, than to have a mass of predigested material imposed on the children. The time is rapidly approaching, however, when some form of laboratory outline must be developed as a guide to teachers in planning their work.

THE BRITISH COLUMBIA SYSTEM

BY J. W. GIBSON, DIRECTOR, ELEMENTARY
AGRICULTURAL EDUCATION

For years the course in nature study and elementary agriculture in the British Columbia school simply consisted of certain chapters assigned for pupils of intermediate and senior grade from Britain's Nature Study and Elementary Agriculture. Whilst it was always possible to base a great deal of valuable work upon the topics treated in Britton's book, the tendency to reproduce for examination purposes the information supplied in the book was so prevalent amongst the teachers that it was decided to frame a graduated course of study, by years, to consist of a topical outline with suggestions to the teacher on method. This outline of topics has been in use a little over a year. It was regarded as tentative, and we are planning to make a revision of it during the present year, so as to incorporate valuable recommendations and eliminate certain imperfections that come to light as the course is being tried out. The course is outlined to cover seven years of public school work—three years of junior grade, two years intermediate (third reader classes) and two years senior grade (fourth reader classes). The course for junior grade (primer classes, first and second reader) includes primary or local geography with an introduction to "the earth as a whole" in

the second reader class. In the intermediate, or third reader classes, general nature study is continued and elementary agriculture is introduced and this is carried through to the end of the senior fourth or entrance class. The topics prescribed throughout are grouped under Animal Life (wild and domestic animals, birds and insects); Plant Life (wild plants, weeds, trees and shrubs); Gardening and Elementary agriculture; and Elementary Science (Physics, Chemistry, etc.). It is intended that the assignments shall be further subdivided into Autumn Work, Winter Work and Spring Work, and a teachers' Manual of Instruction in method will accompany the course as outlined.

The plan of naming the species of birds and wild animals to be studied in each year was adopted. This was also done in assigning studies with wild plants, weeds, trees, etc. Whilst this helps to insure a certain definite amount of work in all schools, it has also a tendency to place too much emphasis upon subject matter or information gained, to the disadvantage or even disregard of the real value of nature study as an educational means. The method whereby teachers and pupils together study the things of nature in their own immediate respective districts is the only correct method in nature study. It therefore becomes important as an essential of all good nature study courses that the objects presented be such as can be found throughout the province or district in which the course is to become operative. In a province like British Columbia this difficulty is well-nigh insurmountable. We hoped in part at least to get over the difficulty by allowing the teachers to substitute other species found in their respective localities for those mentioned in the course of study in case the latter were not available. It was also recommended that the teachers of each city or municipality or of a district having the same climatic and ecological conditions throughout come together in a conference or institute meeting and select a

committee of the best informed teachers of nature study whose business it would be to make the best possible adaptation of the official provincial course to their own district which when approved by the school inspector of the district or by the Education Department would become the recognized nature study course. It will probably be along this line that the best results in framing nature study courses will be arrived at.

There is also the question of optional or alternative courses in nature study. The principal of suiting the topics assigned to the locality in which the work is conducted is a matter of first importance, and as a true pedagogical principle is accepted everywhere. At once the question of city "things" versus country "things" looms up, and at first thought one is likely to jump to a conclusion and say, "Certainly the city has its own peculiar interests and activities and its nature study course should be different from that of the rural district." But wait. We must remember that it is *nature* study we are considering, and, insofar as cities are concerned, nature study is the study of such *rural things* as may yet remain in the city or that can be reproduced or conserved in it. Moreover, it must be remembered that for residential purposes cities are tolerable only as they are able to maintain those things that are essentially rural—fresh air and sunshine, trees, grass, flowers, birds and space for gardens or for poultry and domestic animals. So nature study in cities still must mean the study of the fine things of the country which, on a reduced scale, are still to be found within or adjacent to its boundaries. Its purposes may vary and also its methods, but the subject matter is not to any large extent different from that assigned in the rural school. Availability of material for study and facilities for gardening are the chief controlling factors in any district whether urban or rural.

Optional courses in nature study for schools having school gardens in which the garden becomes the basis of much

THE AGRICULTURAL GAZETTE OF CANADA

of the nature study work have also been suggested in lieu of a general nature study course which does not take cognizance of the school garden. There is much to recommend in optional courses of this kind although there is no occasion to aim at making them wholly different.

In the last analysis success in teaching nature study depends more upon the ability, the interest, the resourcefulness, and the training of the teacher than upon the course of study. As the ability of the teacher increases, the value and also the need of a formal course diminishes and vice versa.

IN MANITOBA

BY R. B. VAUGHAN, DIRECTOR OF TECHNICAL EDUCATION

The activities of the Boys' and Girls' Club is a very strong feature of the work in Manitoba, and wherever an opportunity is provided for boys and girls to get their school instruction carried across into actual operation, on their own responsibility, under supervision, it has very beneficial results.

As the success of the work depends upon the teacher's ability to adapt the agricultural information to local conditions, it would seem to be a difficult proposition to standardize the teaching for the whole of Canada, although it might be possible to adopt a standard

scheme of administration. The following is the course of study adopted in the Manitoba schools:

AGRICULTURE AND ELEMENTARY SCIENCE. (Grades V and VI).

1. The school garden for its own sake, and for the study of (a) Plants—their parts, their relation to water, light and heat; division into annuals, biennials and perennials; germination; propagation from seeds and from cuttings; (b) Insect-life in its relation to the garden.

2. Recognition of ten noxious weeds of the locality.

3. Birds—Special reference to food-habits; seed-eaters, insect-eaters, birds of prey.

4. Animals—Life-history of toad or frog, gopher or squirrel.

5. Boys' and Girls' Clubs—Activities suitable to the ages of the children and the conditions of the district should be encouraged. Full particulars of these activities may be had on application to the Extension Branch of the Manitoba Agricultural College, Winnipeg.

AGRICULTURE AND ELEMENTARY SCIENCE. (Grades VII and VIII).

1. School Garden—Continuation of work of grades V and VI, with special reference to (a) Grains and garden vegetables; (b) Insects injurious to crops; (c) Soils.

2. Birds—Economic value.

3. Farm Animals and Poultry—Recognition of different types.

4. Farm Mechanics and Physics.

5. Boys' and Girls' Clubs—Activities suitable to the ages of the children and the conditions of the district should be encouraged. Full particulars of the activities may be had on application to the Extension Branch of the Department of Agriculture, Winnipeg.

Text, "Elementary Agriculture" (Hatch and Hazelwood), W. J. Gage & Co., Price 60 cents.

THE HOME PROJECT METHOD OF TEACHING AGRICULTURE

A Series of Articles Indicating How Home Project Work is Being Developed in Various Provinces as a Factor in Agricultural Education

HOME PROJECTS IN ONTARIO

BY DR. J. B. DANDENO, INSPECTOR, ELEMENTARY AGRICULTURAL CLASSES

THE home project is recognized in Ontario as an important factor in Agricultural education, in both Public and High Schools. The projects usually take the form of experiments in garden or field, but a considerable number of projects have been undertaken in other branches of agriculture such as poultry raising, live stock, testing dairy cows, work with fruit, and also some pupils with bees. The choice of topic will depend largely upon the interest of the individual, and upon the kind of farming carried on in the locality. Whatever topics may be selected, however, the class work in the schools relates directly to this work, the project being regarded as a series of laboratory problems which are to be discussed in class, and reported upon by the individual directly concerned.

The details of management of whatever project may be chosen, will be in charge of the pupil himself, but it is expected that the teacher will concern himself directly with the guidance and supervision of the pupil in his work at home. This implies that the teacher has time and opportunity to visit the pupil in his home. On the occasions of such visits as may be made, the teacher has an excellent chance, not only to give individual instruction to the pupil, but also to become personally acquainted with the pupil to an extent not possible in any other way—certainly not in school. With large classes it is not possible to carry on much of this kind of personal work, but where it can be done, the possibilities for good are incalculable.

The extent to which home projects are being carried on in the schools may be inferred from the number of schools teaching agriculture. In 1920 there were roughly 1,800 Public and Separate Schools and 32 High Schools maintaining classes in agriculture in Ontario, nearly all of them making use of home projects. In many cases the schools, both High and Public, conduct school gardening or other projects, on the school ground or on land located near the school. Class projects such as these are scarcely less important than the individual home projects. An interesting side light of one of such school projects may be seen from the following statement taken from a letter by the Assistant Superintendent of the Brockville General Hospital:—

"The garden worked by Brockville Collegiate pupils, under the direction of Mr. J. A. Anderson, of the staff of the institute, was of great benefit to our hospital. From this garden we had potatoes, corn, beans, carrots, cucumbers, tomatoes, lettuce, onions, parsnips—sufficient to supply many days' needs. During about one month, we had corn enough to serve one whole institution twice a week. For all of which we are most grateful." M. G. ARNOLD, Assist. Sup., B.G.H.

The lessons which the individuals of a class are sure to gain from a project of this kind may be more impressive than a person at first view may realize.

As the Collegiate Institute at Brockville has no grounds suitable for a garden plot, an arrangement was made to

use the land of a vacant lot or two not far from the school.

The good resulting from the use of home projects may be summarized as follows:—

(1) The school work is linked up with the home;

(2) The pupil receives helpful and individual guidance from the teacher;

(3) The work involved is necessarily more or less original and consequently not mere memory work;

(4) The work develops independence of character.

To those who regard scholastic work as the only kind possessing real value, home projects might be considered more or less of a fad, but education means much more than mere lessons from school books. The memorizing of a piece of poetry, the solving of algebraic problems, or the translation of a chapter of Cæsar, valuable as they are, will fade from the memory long before the circumstances and incidents relating to a completed home project will have been forgotten.

ELEMENTARY AGRICULTURE AS TAUGHT IN MANITOBA BY THE HOME PROJECT METHOD

BY H. E. WOOD, DIRECTOR BOYS' AND GIRLS' CLUBS

IN Manitoba, elementary agriculture is taught on the home project plan through the Boys' and Girls' Clubs. To this end the Departments of Agriculture and Education co-operate, placing the general supervision of the clubs under the control of the Agricultural Extension Service. This plan of organization has proven most satisfactory, as club work not only receives the support of the school inspector and teachers, but of the whole community. It is particularly gratifying to find business and professional men and women, as well as those following agricultural pursuits, giving much valuable time and thought in promoting club work.

The work is divided into twelve distinct projects, which are as follows: live stock, dairying, poultry, grain growing, gardening, cookery, sewing, canning, weed mounting, insect collecting, farm mechanics, and team demonstration and stock judging. There is also the regular school work. Membership is open to any boy or girl, whether attending school or not, between the ages of ten and nineteen years. Except in the case of four sheep clubs organized in 1918, the work until last fall was of such a nature that

members commenced the work in the spring, completed it during the season and exhibited the results of their efforts at the Club Fair held in the fall.

A divisional gardening competition, carried out by the members of seven clubs under the direction and supervision of the school inspector and agricultural representative, resulted not only in many excellent gardens, but exhibits of high-class vegetables at each of these fairs. Each garden was inspected and scored during the summer.

Several clubs have been making a specialty of having a number of their older boys each year grow from two to five-acre plots of registered wheat and oats. This year, at the Manitoba Soils Products Exhibition, exhibits of very high-class seed were made by members of these clubs. As a new feature, cow-testing was taken up by about ten clubs last year, one club having 55 cows under test. This work was carried on in close co-operation with the Dominion Dairy Branch. At some centres the creamery manager did the testing, while at other points the testing was carried on in the school.

During 1920, a special feature was made of team demonstration work. Three lines were introduced, canning, dyeing, and cow-testing. Three members, twelve years or over, composed a team, and they had to be actually enrolled as members of the project they were demonstrating. Demonstration work, in a word, consists of showing others by actually doing and explaining each step in the process. The experiment proved a great success, and 66 girls spent ten days in Winnipeg the week of the Garden Show demonstrating and sight-seeing.

Advantage is taken of motion pictures to show others how club work is carried on.

For 1921, special emphasis is being placed on the home project idea. The work is being broadened out. Instead of raising a pair of pigs for market, some 25 members of one club have recently undertaken to own and care for a brood sow, to raise and exhibit a litter of hogs and ship co-operatively a carload of hogs to Winnipeg.

Seven carloads of certified disease-free Irish Cobbler seed potatoes have been purchased and resold to members. About fifty Junior Potato Clubs are organized, and as a follow-up a number of these clubs are organizing potato demonstration teams. Those taking up potato work are planting at least one-eighth of an acre. The Federal Division of Botany is co-operating with the Manitoba Agricultural College in inspecting these potatoes.

During the last few months four Purebred Calf clubs were started, and the number of Junior Grain-Growing clubs is also increasing. In a like manner the girls' work is receiving special attention, and it is expected that several hundred demonstration teams on a variety of subjects will be trained. A small army of willing leaders has been marshalled to render all assistance possible for the boys and girls of Manitoba to carry forward their club work.

HOME GARDENING AND HOME PROJECT METHODS, BRITISH COLUMBIA

BY J. W. GIBSON, DIRECTOR OF ELEMENTARY AGRICULTURAL EDUCATION

THERE are many cases where school gardening cannot be carried on successfully on account of unfavourable circumstances. Under such circumstances, supervised home projects in gardening or other agricultural work might with advantage be taken up. Even in cases where there are no particular disadvantages and where school gardening is regularly carried on, it is desirable that home-project work be included for public school boys and girls of senior grade.

Supervision by Teacher

Personal visits by the teacher to the homes of those pupils engaged in home-project work are essential. A reasonable

range of choice should first be offered to each pupil concerned. Preliminary plans for carrying out the project should be made by teacher, pupil, and parent together or, failing that, by pupil and teacher together, after which the parent's approval and co-operation should be sought. Not the least of the advantages to be derived from home-project work are consequent upon the development of this spirit of mutual sympathy and helpfulness as between parent and teacher. As most agricultural home projects extend throughout the entire season from spring until autumn or winter, it is required that the teacher in charge of the work visit the pupils' homes at least once before the summer holidays and once after, for

the purpose of inspecting the work and reporting upon it. Every teacher will of course recognize the advantages to be gained by more frequent visits.

Choice of Projects

In deciding upon suitable home projects either one of two plans may be followed: (1) the choosing of a single project which would be uniform and identical for all the members of the class, and (2) dissimilar projects, each pupil taking what best suited him and his home conditions regardless of what other members of the class were taking.

Examples of the first or uniform method would be (a) potato growing, (b) corn growing; (c) rearing a flock of chickens, etc. Such projects as these are handled in accordance with regulations framed so as to make possible a competition with prizes. The pupils taking such a project may form themselves in a club. In all such cases prizes would be awarded on points determined in part by the home score and partly on the exhibit at the school fair. In the case of pupils' home gardens, the element of uniformity may have to do with size of garden and number of varieties grown.

Educationally, the second or dissimilar project method may have more in its favour than the first or uniform project method, but it is lacking in that peculiar interest which associates with comparison of results or competition. For very young pupils the diverse or dissimilar project in home gardening is preferable. Poultry or farm animal rearing projects should not be taken by the pupils below the third reader and are best handled by fourth reader pupils. On the other hand, projects that have to do with soil cultivation are applicable to all public school grades.

It sometimes happens that all of the pupils in a school division or classroom have not equal facilities for home gardening projects. In such cases it can

usually be arranged to give other suitable projects to pupils living in homes where gardens cannot be established. Each pupil engaged in home gardening should prepare a plan of his home project garden, drawn to scale, and should have it approved by the teacher before the planting is started.

Care and Cultural Direction

It is important that home gardens should be successful from the horticultural as well as from the educational standpoint. To this end teachers should be prepared to advise as to location of garden, soil, planting, fertilizing, watering, cultivation, thinning, protection from pests, intercropping and succession of crops, and harvesting.

Correlation with Other School Subjects

School-supervised home gardening is really educational gardening. It is not the growing of crops merely for profit. To this end the teacher must give the work the best possible setting.

Composition.—At least once a week a school period should be devoted to home garden reports and a sort of round table conference held, when questions would be raised by the teacher and also by the pupils which would call for the results of observations made by the pupils individually in their home gardens and which would also challenge to new continuous observation. This exercise forms the best kind of oral composition. Each child who can write should keep a garden diary and every second week or oftener should hand in a garden report—sometimes written in connected story form, properly arranged in paragraphs, and sometimes in brief tabular form, under date. Such points as description of home garden location, size, the soil and its preparation, planning, varieties grown, source of seed, amount used and cost, method of planting, germination, description of young seedlings from week to week, kind and amount of

work done in planting, cultivation, thinning, watering, etc., description of pests and hindrances, effects of weather conditions, first flowers to bloom, first vegetables used, number of days from planting, market value of the crop and how disposed of, etc., should be dealt with in reports and garden stories.

Drawing.—Stories written descriptive of the gardens and of the crops grown should be accompanied by drawings, as illustrations.

Arithmetic.—A wide range of practical problems in arithmetic can be based upon the home project in gardening. These problems will have to do with measurements, perimeters, areas, volumes, values, accounts, etc. The teacher should write down from week to week series of questions based upon home experiences in gardening and other projects. These problems are real to the pupils; they are essentially concrete and operative, and do not deal with the usual make-believe transactions which are the basis of the usual book question in arithmetic.

A complete and accurate statement of receipts and expenditures should be compiled by each pupil during the season and submitted as part of the pupil's report on the project undertaken. This will introduce the pupil to the ordinary business forms and methods of accounting.

Nature Study and Geography.—The home garden offers an excellent field for the observational side of nature study. Each succeeding day brings some new aspect or development. The person who daily works in a garden with eyes, mind, and heart open finds there much to interest and instruct—a constant challenge to further investigation.

Here also some topics which usually relate to geography may be dealt with, such as soil study, origin of soil, kinds

and how produced, effects of rain, wind, sun, frost, etc., upon the soil and the garden plants, etc. Weather observations take on a new significance and have a new interest when linked up with daily personal experience.

The relationship of this home project work to industrial or commercial geography will also be apparent. The value of the produce raised at once causes the pupils to take an interest in market reports and marketing. The character and value of imports and exports and the great problems of transportation become topics of real interest to pupils who are themselves dealing in commodities that have real value.

Manual Training and Domestic Science

Home gardening and home project work generally, furnish what might be termed motivation in connection with the whole round of school studies. Nowhere in this more apparent than in the case of boys in manual training. It gives directness and tangibility of purpose to their work. It creates real problems demanding immediate and practical solution. It stimulates initiative and independence of action. If the boy finds that he needs a soil screen in his gardening work, or a feeding hopper in connection with his chicken-rearing project, he devotes his best attention to the making of them. Similarly the interest which girls take in the cooking of vegetable dishes, for instance, will be keener and the satisfaction greater if they can furnish the materials from their own gardens. A young girl will find new inspiration in arranging table decorations if the flowers are of her own growing.

This intimate human relationship as between school exercises on the one hand and out-of-school experiences on the other cannot fail to benefit the school and the home.

SCHOOL-HOME PROJECTS IN THE CHILLIWACK HIGH SCHOOL

BY J. C. READEY, INSTRUCTOR IN
AGRICULTURE, CHILLIWACK, B.C.

HOME projects in agriculture have been made a part of the regular instruction in agriculture in the Chilliwack High School this year for the first time. The following is the list of options presented to the students, with the regulations governing the work:—

School-home Projects in Agriculture

1. The work is intended to fit into and be a part of the regular home business. In the case of students living in town, projects suited to those conditions will be arranged.

2. The written consent of the parent or guardian is necessary before the work may be undertaken.

3. The projects are divided into majors and minors. Two minors will be accepted as one major.

4. A maximum of twenty per cent of the total school credit in agriculture will be allowed for the satisfactory completion of one major or two minors.

5. Projects not named in the accompanying list may be arranged for with the instructor.

6. Records of dates, weather, cost, and such other data as may affect results must be kept wherever they apply.

7. As far as possible the result of the work itself must be exhibited at the annual School Fair. In all cases the records must be shown.

8. Advice, suggestions, and information should be obtained by the student from every available source. Especially should the student consult with his or her parents and neighbours, the Agricultural College, University of British Columbia, and the Dominion Experimental Farm at Agassiz.

9. The student is required to assume full responsibility for the project and is expected to do as much of the actual work as time will permit.

10. In each case the minimum amount of work is stated. Students may take larger areas or amounts but are cautioned against undertaking more than time and money will permit being well done.

Agronomy

1. Spray a field of potatoes for late blight, not less than $\frac{1}{4}$ acre. Minor.

2. Grow a cereal crop of not less than one acre. Major.

3. Make a survey and supervise the drainage of at least one acre. Major.

4. Grow a crop of corn for ensilage, not less than two acres. Major.

5. Grow a crop of mangels, not less than one-quarter acre. Major.

Poultry

1. Crate-fatten at least twelve chickens. Minor.

2. Operate an incubator using at least 100 eggs. Minor.

3. Hatch, and raise to first laying period not less than fifty pullets. Major.

4. Take over the management of the home flock of poultry, not less than fifty, from the first of January to the thirty-first of December. Major.

Live Stock

1. Raise a bunch of hogs, not less than six, from weaning to marketing. Major.

2. Keep feed and milk records of at least four cows for ten months. Major.

3. Halter-break, fit, and show a draft colt at the Chilliwack exhibition. Minor.

4. Care for a flock of not less than twelve sheep for a year. Major.

Farm Management

1. Draw a set of plans for a barn to accommodate twenty head of cattle and three horses, with silos and milk-room.

Give list of material and itemized statement of cost of completed building. Show the position of the barn as it would appear on a particular Chilliwack farm. Major.

2. Draw to scale a plan of the home farm. Determine the distance from the horse stable to the intertillage field gate and the number of trips made during the season (1) without implements, (2) with implements, and the average time required to make the trip. Major.

3. Given eight thousand dollars in cash, prepare a plan for the disposition of this amount in the purchase, equipment, and management for the first season of a twenty-acre farm located within five miles of Chilliwack. Major.

4. Keep the cost account of one enterprise on the home farm. Minor.

Rural Economics

1. Determine the crop yields and market prices of at least three crops within a radius of three miles of your home. Major.

2. Make a farm animal census over a district within a radius of three miles from your home. Major.

3. Find the average number of farmers' autos that are in town on at least ten Saturday evenings during the year. Determine the capital cost, depreciation, interest, and up-keep charges on this average. Major.

4. Prepare a statement showing the relative amounts expended for churches, schools, roads, and public amusements in this district during the year. Major.

Horticulture

1. Prepare for, plant, and manage for one season not less than one-eighth of an acre of strawberries, or one-quarter acre of bush fruits. Major.

2. Renew an old orchard, not less than twelve trees, by doing the necessary cultivation, pruning, spraying and grafting. Major.

3. Plan and conduct a home garden of not less than 5,000 square feet. Major.

4. Make and care for a hot bed, not less than 40 square feet in area, supplying the home needs and selling the surplus. Not less than three crops. Minor.

Parent's Consent

I hereby certify that I understand the purpose of the School-Home Agricultural Projects of the Chilliwack High School and agree that

(student's name) shall have the time, advice, and finances necessary to

(carry out project) during the year.

I also agree to permit h to exhibit the result of h work at the first Chilliwack School Fair following the completion of the project.

Signed,

..... Parent.

..... Guardian.

The object in introducing the home project has been three-fold. First, to link up the interests of school and home; second, to develop ability in independent effort, and third, to give concreteness to the class discussions. The home project will not displace the High School outdoor laboratory, familiarly but erroneously called the "garden." The home project is a practical, every-day job which is a part of or closely allied to rural home activities, undertaken by young people who are making an intensive study of the science underlying that particular job. On the other hand the High School garden is a laboratory for the elucidation of those sciences underlying the rural home activities.

It is yet too soon to say what the value of the school-home project will be. It has created already a very live interest among the members of the class and has met with unanimous and even enthusiastic approval from the parents.

TEACHING BY MEANS OF HOME PROJECT, NOVA SCOTIA

L. A. DEWOLFE, B.A., M.SC., DIRECTOR OF RURAL SCIENCE SCHOOLS, TRURO, N.S.

IN Nova Scotia, home projects are in the hands of the individual teachers.

We follow no general system, and no pressure except moral suasion is brought to bear on these teachers. We have no means of compelling such work, as it is not required in our school course. We have no weapon to hold over the teachers to demand such effort; it is wholly optional on their part.

Possibly thirty or forty teachers are doing creditable work by the project

method. Very many teachers have organized Garden clubs and Improvement clubs. Under the influence of the Department of Agriculture, a number of Poultry clubs and a few Live Stock clubs have been organized. Unfortunately, however, the teacher rarely possesses the ability to make these broadly educative.

We are not progressing; for our trained teachers leave us before they have made a lasting impression on their schools or their communities.

HOME PROJECT WORK IN THE SCHOOLS OF NEW BRUNSWICK

BY A. C. GORHAM, DIRECTOR OF ELEMENTARY AGRICULTURAL EDUCATION, DEPARTMENT OF AGRICULTURE

NATURE Study and Agricultural Instruction is obligatory in the elementary schools of New Brunswick. For high schools agricultural botany is prescribed by the Board of Education. This work is inspected by the regular inspectors of schools.

Besides the class-room course in Nature Study and Agriculture mentioned above, other activities are carried on through the schools by the Department of Agriculture to further the cause of agricultural education. These optional phases of the work are as follows: establishing of School Gardens; Summer Science School to prepare teachers to take up this work; project work with Poultry and Home Gardens; School Fairs.

I wish to write particularly of the project work. The project is the logical

outgrowth of good teaching. The genuine teacher will correlate this practical work with the class room studies and lead the pupils to master the problems which must arise from such exercises. The boy or girl is interested because he or she is allowed to choose within certain limits the kind of project they wish to carry out. It is his to work on his own initiative. Thus he feels the responsibility. He endeavours to follow brief instruction and produce a crop or a flock of chickens. In brief it is purposeful experience.

Last year over 3,800 boys and girls planted and cultivated more than 4,500 home plots. Instructions were pretty thoroughly carried out and results were very encouraging.

LEADERSHIP

FROM AN ADDRESS BY MISS ABBIE DELURY, DIRECTOR, HOMEMAKER'S DEPARTMENT,
UNIVERSITY OF SASKATCHEWAN

It is regrettable that to many of us the memory of our childhood on the farm revives only thought of continuous hard work. These are not the memories we love to cherish and live over again in our minds; but those we strive to forget. It is very true that we are workers, and of necessity must be, to accomplish our mission here. We have our own work; and no one can do it for us. It is ours—our very own. But, fortunately, we are equipped for our life work, we possess the necessary faculties, although they are latent within us, when we are born. We must study ourselves to know our special gifts, and then develop these. All this requires of every individual a persistent effort. Work is the universal coin. If we are willing to pay the set price, we can demand anything, but we must present the price in full, before we can deservingly accept what we desire to obtain. Thus, it is very apparent that to live a successful life, we must be a worker. We must like work; we must know how to work. Love for work and efficiency are both the fruits of continuous hard labour. But, in spite of this, life—a complete life—consists not of work alone. We instinctively crave relaxation and recreation. Varied activities are necessary to permit the expression, and to promote the development of all the positive human impulses. In the absence of such activities, we cannot grow, we cannot do our best work, we cannot be happy.

Make Rural Life Socially Attractive

People, the younger ones in particular, are not satisfied with rural life as it is to-day. The young people are flocking to our cities because of the monotony and drudgery of rural life. Those

who remain, at least many, are not contented, and their development is dwarfed. Regarding those who go to the city—it might be well to compare, in our minds, city and country life. Rural life can be made ideal, city life sometimes can, but life in a city is less natural and more restrained, because of the congestion of people. As yet, there is nothing particularly elevating and cultural about the life in our western cities, except what the few people of real culture and refinement contribute. Our city life, in general, is very primitive and crude. Well, then, since our cities have nothing desirable to offer except educational institutions, would it not be to the best interest of our young people to turn their thoughts and energies towards rural life, and aim to make it attractive, and with sufficient scope to allow for the expression of all the positive human impulses?

To begin, we must have leaders, and surely there are trained men and women, in nearly every community, gifted with talents for leadership. We are certain they are to be found. In passing, let us ask these most important questions: (1) Will those who are qualified accept the responsibility of leadership? (2) Will the community accept or recognize these men and women as leaders, and pledge its support? When we really become interested, we shall have no difficulty in securing leaders, and those chosen will succeed, because of their own talents and our sympathetic co-operation.

For leadership, we need talented people with latent talents at least. Those who are at all familiar with our children and young people will grant that they are resourceful and gifted. They possess unlimited talents. People may say, we have no talent for music, debating,

dramatic or literary work. These statements are false, and insults to our young people, and signify only the blindness of the observer. The young people are gifted, but their talents are often obscured because of lack of means of development. Considering the material, there is absolutely no limit to the number of community activities we might initiate. We shall, however, suggest only a few, which ought to be organized in every community.

A Debating Society

Many men and women find themselves to-day in positions where they must express their thoughts in public. Many have worthwhile thoughts, which are the fruits of free thinking and broad life experiences, but they cannot express them—they cannot convey them to others. They lack confidence, and sometimes words. The confidence develops with experience. Such people feel the need of training for expression, and a debating society will bring the desired opportunities. In debating, the faculties for expression are developed, but this is not all, knowledge is gained. In the discussion of a topic, the outlook as a whole broadens. The ideal training for expression should begin, in the junior grades in our schools, and continued through the grades. The children love it, and quickly master speaking, because they are not self-conscious. It is not enough to train people to think. They need also the power of expressing their thoughts, in as beautiful language as possible, and with as much grace and ease as possible. A debating society provides unlimited scope for the development of all the talents of a community in logic and expression.

Music and Dramatics

The time cannot be far off when each community will have its own orchestra and musical club. Already there are a few communities which have accomplished this, and not because they were blessed with a large number of specially

trained people, but because they had a man or woman with a vision and will, who saw what was needed, and started to work. In the past, people had not time to interest themselves in music; but now that the simple necessities of life have been provided, people are ready for that which stimulates the higher development of the individual. In speaking of music, we must not forget community singing. Let us get together and sing the songs we knew when children. These old songs will bring before us a picture of home, of childhood, and kindle about us the kindly influences, which then surrounded us, and send us on our way through life with renewed faith and courage. Music not only delights, it inspires. Its value can never be put in words.

It has often been said that children are born actors. It is little wonder, then, that plays make such a strong appeal to young people, and awakens such a quick response. The children love nothing better than acting, and they do it admirably because they are not self-conscious. The young people love it, too, for it involves such scope for action and expression. There are in the province a number of amateur dramatic societies, and they are doing a splendid work for themselves and their community. Those who participate, invest their talents and receive unheard of dividends; besides, they provide entertainment which is both pleasing and inspiring for the whole community.

Reading Clubs

The people, a few years ago, worked from sunrise to sundown, and at the close of the day their energies were spent. They desired only sleep. They had no time for reading. Those who had read extensively, by force of circumstances, had to leave their beloved friends on the shelves, year after year. It is very true that when people are physically tired, their mentality is at its lowest ebb. It is then impossible to read a book and enjoy it; to inquire into the theme; to remember it. Thus, even booklovers ceased to

read. People now have a little time, and this they want to invest. They cannot do better than spend their spare moments with our worth while authors. Those who know books know what to choose. This class does not concern us. It is those whose knowledge of books is limited and superficial, and who have no interest in books, and have never read anything worth while that need help. They lack even the most elementary working knowledge. For the benefit of this class reading clubs are organized by those who love books and enjoy them. To illustrate—Mrs. Jones is a lover of George Eliot's books. She has read the author's life. She knows her personality and outlook. She invites a number of women, who know nothing of these books, to come to her house an evening or two each week. She tells them about the author's life, and reads aloud one of her books. In reading, Mrs. Jones conveys to her hearers a degree of her own deep appreciation of the book. Their interest is awakened. They will be interested in

the author's other books and read these alone. Mr. Gray is interested in Economics. He invites the men to joint with him in reading and discussing this subject. All these efforts in themselves may seem small and insignificant, but all will stimulate the interest in books. It is interesting to remember, in this connection, that some of our most interesting and delightful men and women have educated themselves by reading. Further, they have a vision of the ideal, and a passion for the ideal, which few men and women educated in our best universities can claim their own.

Every community has leaders, and young people possessing unlimited talents. With all these resources rural life can be made attractive, and so broad that people will find scope for work, relaxation and recreation. Then it will no longer be necessary for people to journey thousands of miles to live a few months of each year. They will find life at home, in their own community, throughout the entire year.

THE LIVE STOCK PROJECT OF THE MANITOBA BOYS' AND GIRL'S CLUBS TO BE ENLARGED

BY H. E. WOOD, IN CHARGE OF BOYS' AND GIRLS' CLUBS

Since the inception of Boy's and Girls' Clubs in Manitoba, the care and feeding of live stock has been one of the most important lines of work carried on by the members. Back in 1912 the work began with a number of boys and girls undertaking to feed and look after a pair of pigs which, later were exhibited at the first club fairs. During the past season a visitor at almost any one of the 220 fairs held in the province saw the members exhibiting pigs, calves, sheep and colts, that they themselves had cared for and trained. Live stock rearing, as a project in the club programme, still occupies the premier position.

During November and December, several of the clubs that had made a particularly good showing in live stock made

an effort to place the live stock project on an even broader foundation. The character of the exhibits of stock at club fairs convinced many people, especially farmers, that the work being undertaken by members of these clubs is of a constructive nature and of lasting benefit. Club officers, however, felt that an even more comprehensive plan could be launched upon; and to this end several Junior Live Stock Clubs have been started. Instead of securing a pair of pigs, about the first of May, and feeding these until they are exhibited at the fair in the fall, and then selling them to the butcher, members of the Junior Pig Club will secure a good brood sow in the fall or during the winter, rear a litter of pigs, and thus become actual breeders

rather than just feeders. This will give the boy the option of carrying on this work throughout the whole year and at the same time give him the opportunity of acquiring the fundamental principles underlying the science of animal husbandry. Incidentally, it should be the means of establishing the member as a

breeder of pure-bred live stock. In a word, the boy that undertakes this work not only should learn how to feed and care for stock, but should be instructed in the science of animal judging, and at the same time be building up a small herd of stock which is his own property.

CHILDREN'S LIVE STOCK COMPETITIONS AT THE EDMONTON, ALBERTA, SPRING LIVE STOCK SHOW

The Edmonton Spring Live Stock Show offers \$2,120 in cash, besides other special prizes and donations, to winners in the Children's Calf Feeding, Sheep Feeding and Swine Feeding Competitions.

Prizes and awards are donated by The Swift Canadian Company, Ltd., The P. Burns Company, Ltd., The Edmonton Stock Yards, The Dominion Department of Agriculture, The Dominion Shorthorn Breeders' Association, The Alberta Shorthorn Breeders' Association, The Canadian Hereford Breeders' Association, The Alberta Hereford Breeders' Association, The American and Canadian Aberdeen Angus Associations, The Alberta Aberdeen Angus Association.

The Holstein-Friesian Association of Canada, The Canadian Ayrshire Breeders' Association, His Honour, the Lieutenant Governor, The Hudson Bay Company, besides numerous business firms and individuals. The Calf Feeding Competition is divided into Beef and Dairy classes.

Complimentary Luncheon

The Swift Canadian Co., Ltd., of Edmonton, have arranged to take all the boys and girls who make entry in the Children's Competitions, on a special trip of inspection through their packing plant. A luncheon will then be given the children in the big dining room.

CHILDREN'S CALF COMPETITION AT THE WESTERN FAIR, LONDON, ONT.

The Western Fair Association, London, Ont., will hold a boys' and girls' calf competition at their 1921 exhibition. This competition will be open to any boy or girl over ten and under seventeen years of age, resident in Canada. The

calves shown may be pure-bred or grade of any beef breed calved on or after September 1, 1921. All grade calves must have a registered sire; \$1,000 will be offered in prizes, the first prize to be \$100.

**WINTER COURSE IN AGRICULTURE AT THE MOOSEJAW
COLLEGIATE INSTITUTE**

An opportunity is presented to boys and girls of Moosejaw and the surrounding districts to enter the Moosejaw Collegiate after the fall work of the farm has been completed and spend the winter in study along lines that have a direct bearing on either what is to be their later life work or which will always closely relate to every other occupation in Saskatchewan.

The course extends over a period of three or four months, depending upon

the time that spring work commences on the farm. It is the second course of its kind offered by the Institute, and is designed to appeal to boys and girls from the farm who have acquired only an elementary education.

The course of studies includes instruction in Field Husbandry, Animal Husbandry, Dairying, Poultry, Horticulture and Forestry, Agricultural Engineering, Rural Economics, Household Science, and various academic subjects.



PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes

SUNFLOWERS SILAGE FOR THE WEST

BY PROFESSOR G. H. HUTTON, SUPERINTENDENT OF AGRICULTURE AND ANIMAL INDUSTRY,
CANADIAN PACIFIC RAILWAY

THE developments of the last three years have brought the sunflower to the front as one of the most satisfactory crops that can be grown for silage purposes. It has been proven by experiments and extensive private feeding trials that the sunflower yields well, the silage is palatable, and is at least equal, if not superior, pound for pound, to corn silage. Many comparisons made between corn silage of the best quality and sunflower silage have shown the balance of economy of gain in beef cattle and yield of milk in dairy cattle in favour of the sunflower.

The experiments carried on by the Agricultural and Animal Industry Branch of the Department of Natural Resources of the Canadian Pacific Railway were not conducted with corn of the highest quality for the reason that in the particular locality in which this test was conducted it is not possible to bring corn to the dough stage every year. In consequence the corn used could not be considered as having reached the most desirable stage of maturity to produce the highest quality of silage. However, comparisons were also made with peas and oats silage and sunflower silage and were strikingly in favour of the sunflower. The peas and oats of course had reached the point of prime fitness for silage and gave a very satisfactory yield of about seven tons to the acre. But pound for pound they were not equal to

the sunflower crop when fed to dairy cattle, and the yield from the latter was almost thirty-five tons to the acre, or five times as great as the yield of peas and oats.

The following table indicates the yield in green weight per acre of sunflowers, corn, and peas and oats, the moisture content at the time the crops were put in the silos, and the yield in dry matter per acre:—

Kind of Crop.	Yield per acre in pounds Green Weight.	Per cent Mois- ture.	Yield per acre in lbs. Dry Matter.
Sunflowers	79,200	82.41	12,034
Corn	27,980	78.72	5,745
Peas and oats . .	14,000	62.64	5,230

The same machinery that is used for the handling of the corn crop is used for the harvesting of the sunflower crop. For seeding we use an ordinary grain drill, stopping up the spouts to sow in rows about thirty-six inches apart. If the seed is of high quality five pounds per acre will distribute it so that the plants will be from three to four inches apart in the row, which is sufficiently thick. We have seeded five, ten and fifteen pounds per acre, and believe that five pounds per acre under ordinary conditions will prove about right. The seed cost twenty-two cents per pound in 1920, and will cost about fifteen cents in 1921

for the best grade of Russian Giant sunflower seed, which is a black seed with white stripes, and which we believe out-yields any other strain.

The crop responds to cultivation as quickly as does the corn crop and is ready to be put in the silo at about the same season. It should be cut when about forty per cent in bloom, or when the first plants to bloom have reached the dough stage. After having gone through the cutting box the sunflowers are in finer particles than corn, and in consequence pack more densely in the silo, permitting of greater than the rated tonnage being stored.

This crop has proven a suitable one to be grown under irrigation and has also proven very satisfactory as a dry land crop. In fact its ability to resist drouth is one of its strong points. The Experimental Station at Scott, Saskatchewan, reports a yield of about six tons per

acre with a precipitation of less than two inches during the growing season. Another important feature is its ability to withstand frost. At the University of Alberta in 1920 a very striking evidence was given of the difference between this crop and corn since the growth of the sunflower did not appear to be delayed by a frost which caused a decided check in the growth of corn planted alongside the sunflower crop. It has been stated by some authorities that the sunflower will stand six degrees of frost without injury.

From the experience I have had with this crop I am satisfied that it will be developed until it is one of the main forage crops in the West, and because of its adaptability to a wide variety of conditions such as drouth; its suitability for irrigation; its resistance to frost; and its high feed value, it will mean millions of dollars of increased wealth to the stock growers of this country.

SEED CENTRES

BY L. H. NEWMAN, SECRETARY, CANADIAN SEED GROWERS' ASSOCIATION

IT is probably safe to say that nothing of greater importance to agriculture has been revealed by careful experiments than has the difference that exists in the producing ability of different varieties, strains, and qualities of seed. Every practical farmer who has profited by his observations is alive to the importance of using not only the variety best suited to his own particular conditions of soil and region, but seed belonging to high-producing strains of that variety and which, in itself, excels in vitality and vigour. The enormous national importance of the use of the very best seed is impelling. For many years the importance of this problem has been recognized in a greater or lesser degree by those concerned officially, and otherwise, in the welfare of agriculture, and many agencies have been at work

with a view to effecting an improvement in the general situation. Among these agencies might be mentioned the field crop competitions, seed fairs, the work of the Ontario Experimental Union, and of the Canadian Seed Growers' Association. While these various organizations have undoubtedly accomplished a good deal, yet we must admit that the situation is by no means in as good a position as it should be. Many may be surprised to know that investigation reveals the fact that even at this late date quite a large percentage of farmers do not even know the names of the varieties they are growing. Many continue to grow the same grain year after year, admitting that their yields are not what they should be, but attaching the blame entirely or largely to soil and seasonal

conditions. Other farmers are continually changing their seed without law or order, and with utter disregard for results obtained in comparative trials at Experimental Stations or elsewhere.

Unfortunately, the farmer who is most lacking in information is not the farmer that is being reached by any of the above-mentioned organizations. How to reach this type of farmer is, and probably will continue to be, a very large and more or less insoluble problem. Looking at this question from the standpoint of a practical farmer, one cannot help but come to the conclusion that the most effective and practical method by which more farmers will be brought to sow better seed each year will consist in some plan whereby seed of particularly good breeding and quality may be produced in quantity within reasonable reach of every farm, and at a reasonable price. The suggesting of any plan such as this may savour of the idealistic and may not be entirely practicable. On the other hand, if some general plan could be worked out, having the above situation as its objective, a great public service might be rendered.

In seeking to work towards such a plan, it would seem advisable to utilize, as far as possible, existing organizations. Of these, probably the most helpful are the field crop competitions, in which several thousand farmers participate each year. These competitions, undoubtedly, have done a great deal to interest farmers in better seed, although, as already intimated, they do not reach the class of farmer who is most in need of help. They have not, so far, provided a source of high-class seed of approved varieties to the extent that they might. In order to remedy this condition, steps are being taken to award prizes, not only on the basis of the standing crop, but also on grain threshed therefrom.

Demand for Registered Seed

A question which naturally arises is: What is the demand for registered seed

and what premiums over market prices may be expected for this class of seed? Perhaps this question may best be answered by saying that the market has never yet been glutted with a really superior article. At the present moment the Canadian Seed Growers' Association is endeavouring to assemble in Ontario a number of carloads of registered Banner oats. Strange as it may seem, the supply to meet the ordinary demands of the trade is not adequate. In spite of the fact that Ontario harvested a splendid crop of oats last season in most parts, yet, when it comes to getting together in any one district a carload of registered Banner oats, one immediately runs into difficulties.

During the past few years enormous quantities of seed oats and wheat have been purchased in Canada by the Seed Purchasing Commission appointed by the Federal Government, with headquarters at Regina, Sask. The duty of this commission was to find seed grain of a certain standard for needy municipalities in Western Canada. The municipalities paid for the seed and sold it to farmers usually on time. The commission, as well as the department which it represents, has come to the conclusion that the time has arrived when no public or other organization is justified in facilitating the distribution of seed of a lower grade than that required by the standards set for registered seed.

Many Seed Centres Needed

It is an interesting and noteworthy fact that practically ideal conditions are necessary for the production of the best grade of seed. Such conditions, unfortunately, are never enjoyed by an entire province. Looking back for the past fifteen years, I should say that not more than 25 per cent of the total cultivated area in Ontario during average years was favoured with conditions suitable for the production of really first-class seed. Taking Canada as a whole, I find that

of all samples sent in for examination, pending registration, only about 20 per cent are good enough to merit this recognition. This fact demands that seed centres be not only numerous, but be widely scattered. Some years the efforts of growers in certain centres will reward them with very little, if any, extra remunerations, while others may profit handsomely. The following year the reverse may be the case. Having in mind the demand for registered seed, together with the vagaries and uncertainties of season, the average farmer should accept as a matter of good business the general rule to sow only registered seed, to give this seed the very best opportunity, and so take a chance of harvesting a crop which may be eligible for registration and which will pay him well to handle for seed.

I cannot think of any action on the part of agricultural representatives which would bring quicker and more far-reaching results than by seeing to it that at least one good seed-producing centre be established in each of their respective districts. If this can be accomplished through the medium of field crop competitions, well and good; but if this does not promise to work out satisfactorily, steps should be taken to locate, if possible, a suitable section where high-class seed of the kind most in demand may be produced to a high degree of perfection and in considerable quantity. In 1913 the Canadian Seed Growers' Association, in co-operation with the agricultural representatives of Ontario, undertook a province-wide campaign to establish a large number of these centres. The foundation was laid for sixty-two such centres, but at the present time there are less than half a dozen

which are of any consequence. Of these, probably the North Gower Banner Oat Centre, situated in Carleton county, near Ottawa, is the most noteworthy. This year this centre will have approximately 3,000 bushels of registered Banner oats to offer. Each year since the centre became established there has been a very creditable lot of seed available, and all registered seed has been sold at a very satisfactory premium above the current market price. The success of this centre may be attributed very largely to the fact that it is situated within easy reach of the headquarters of the Canadian Seed Growers' Association, whose officers have been able as a result to follow the work from year to year, to encourage the growers, and to assist in the disposal of their product. Our experience clearly shows that a definite follow-up system is imperative. To do this efficiently requires more time than the average agricultural representative has at his disposal to give. The province of Quebec is overcoming this situation, and incidentally making rapid strides, by having a special field crop officer whose duty it is to follow up the work in the different seed-producing centres.

The Agricultural School at Kemptville, Ont., will this year offer several hundred bushels of excellent seed oats, barley, and wheat. This institution in this one particular alone is destined to render an exceedingly useful service to eastern Ontario.

The Canadian Seed Growers' Association is organized to check up the details of the work of producing high-class seed, to issue certificates of registration, and to attach the final seal to all sacks of registered seed merchandised.

THE FRUIT INDUSTRY OF THE OKANAGAN VALLEY, BRITISH COLUMBIA

BY H. H. EVANS, DISTRICT INSPECTOR, VERNON, B.C.

IN British Columbia, as in any other country where new agricultural ventures are undertaken, many have been the mistakes in the earlier years of development. This is true of the fruit-growing industry of the Okanagan Valley, to a considerable extent, but, today, with the experience gained, the orchardists of the Valley are now at a point where they realize that attention to organization and the practical application of the scientific principles of fruit growing are two necessary factors in attaining success.

Orchard Management

In the interior valley of British Columbia, lying within the area known as the "Dry Belt," where irrigation is generally practised, the system of orchard management obviously presents different phases to those exhibited in sections where the rainfall is sufficient to give the trees the necessary amount of moisture. It may be stated that, as a general rule, fruit trees under irrigation have a tendency to come into bearing at an earlier age than in other sections. Many varieties start to bear four years after planting and in eight years are bearing heavy crops. On this account it is essential that close attention be paid to the details of pruning incidental to tree development, inasmuch as it is essential that a strong structure be created to carry the crop. There are several phases of orchard management which must be considered, viz.:—Selection of suitable varieties, cultivation, irrigation, cover crops, fertilization, pruning, spraying and thinning. Most of these considerations obviously enter into correct orchard practices in all fruit-growing sections

and I shall draw attention only to those that are peculiar to the Dry Belt as they vary from the fruit-growing practices of other sections in Canada.

Selection of Varieties

It is now recognized that certain varieties are peculiarly adapted to individual conditions of the different fruit-growing sections of Canada. In the early days of the industry in British Columbia this point was not fully realized and the early plantings were of varieties which are now known to be unsuitable. At the present time growers working in co-operation with the officials of the provincial Department of Agriculture, have a very fair understanding of the commercial varieties which excel in each of the fruit-growing districts of the province. Some years ago a tentative schedule of the suitable varieties for the various districts was drawn up by the provincial Department of Agriculture, and this schedule has been improved upon to such an extent that we are able to state with a reasonable degree of accuracy the varieties which may be commercially planted in any given district. The schedule furthermore, is elastic and allows scope for the addition of new varieties which are appearing from time to time. So far as the Okanagan irrigated districts are concerned, the following varieties are now known to excel under dry, irrigated conditions:—

Apples—

Winter Banana
McIntosh Red
Wealthy
Duchess
Rome Beauty
Delicious
Jonathan
Wagner

Newtown Pippin
Winesap
Y. Transparent
Salome
Ben Davis
Gano
Northern Spy

Bartlett
Flemish Beauty
Clapps
Douyon De Comice
Beurre Anjou
Beurre Diel
Clairgeau
Dr. Jules Guyot

Winter Nellis
Howell
Duchess
d'Angouleme

Crab Apples—
Transcendent
Hyslop

Plums—

Peach Plum
Bradshaw
Black Diamond
Ponds Seedling
Yellow Egg
Tragedy
Columbia
Italian Prune

Cherries—

Bing
Lambert
Royal Anne
Black Tartarian
Montmorency
E. Morello
Duke

Cultivation, Cover Crops and Fertilizers

Clean cultivation has been the rule for a number of years in Okanagan orchards. Owing to the hot, dry climate, this method of orchard management has steadily depleted the amount of humus in the soil and has materially affected the fertility of the soil. During the past few years this depleted condition of soil fertility has been forced very much to the front, and in order to build up the soil and increase its humus content, the provincial department is conducting a series of soil fertility experiments with cover crops, commercial fertilizers, lime, manure and sulphur, in combination and individually, to determine the most satisfactory, practical and economical method of re-establishing the desired condition. The fruit growers likewise have appreciated the fact that while clean cultivation has forced their trees into stronger growth and earlier bearing, they have thereby sacrificed the necessary soil constituents, and they are now fully alive to the necessity of building up their soils.

We have such conditions as Baldwin Spot, Drought Spot, Rosette and Wilt, and similar physiological conditions, which obviously relate to depleted soil conditions, and the experiments conducted to date appear to point most definitely to the fact that these troubles may be largely obviated, if not entirely

eliminated, by improving the humus content of the soil combined with the addition of certain necessary soil elements. We are not at the present time in full possession of the most desirable procedure to follow, but it is hoped that in the course of the next few years we will be able to place before the orchardists of British Columbia a clear statement on the best methods for re-establishing the soil. There are many aspects of the question which require careful consideration, and the matter of the soil itself is not necessarily the most important.

Irrigation

The soils of the Okanagan Valley are largely volcanic in origin. The annual precipitation for the entire valley averages about 14 inches in the year. Consequently, it may be readily seen that the soils in the "Dry Belt" are of very little value without the application of water. An adequate supply of water is one of the necessary adjuncts to successful fruit growing. Furthermore, it is vitally essential that the moisture content of the soil be maintained in an even manner, and every effort must be made to prevent soils drying out by intermittent or haphazard methods of irrigation. The water supply is very largely in the hands of water companies who distribute the water on a pro rata basis of so many acre feet. Under average conditions the approximate amount of from 2 to 2½ acre feet is necessary on upland soils. It would be as well to state, however, that experiments are being conducted at the Dominion Experimental Farm, Summerland, B.C., and by the Provincial Department of Agriculture to ascertain precisely the amount of water necessary to produce the best results.

Pruning

The systematic pruning of fruit trees in the Okanagan Valley, is a general practice adopted by the great majority

of fruit growers. While there is still great need for further study on the influence of pruning on wood and fruit development, the system that is at present generally recommended is one that tends to develop a semi-pyramid type of head with a modified leader. Particular attention is given to the angles formed between the branches of the main trunk. These angles should be as nearly as possible right angles, and the main limbs must be from 5 to 8 evenly spaced up and around the central leader in its first 5 to 8 feet of growth, after which the central leader is dispensed with and the whole head of the tree encouraged to maintain uniform development. A moderate annual pruning is generally recommended.

Spraying

The fruit growers of the Okanagan Valley are not troubled with such insects as the Codling Moth, San José Scale, Plum Curculio, Apple Maggot. Nevertheless, such pests as the Aphids, Red Spiders and Blister Mites, etc., are more or less common, and these pests are used as a reason to continue and build up our system of pest control.

Of the diseases, Powdery Mildew is distributed throughout the entire Valley. At least two applications of Lime Sulphur during the spring and early summer are needed to keep it under control. Apple Scab is distributed only in the northern end of the valley and this disease is readily controlled by two applications of lime sulphur in the early summer. The other diseases that are well distributed are Peach Mildew

and Plum Rot. Of the bacterial diseases, Fire Blight is pre-eminently the most important diseases attacking some fruit trees, and it would appear that the irrigation conditions produce a more virulent type of attack than in districts where the precipitation is natural and normal. The importance of this disease necessitates careful attention.

Packing and Marketing

The packing and marketing problem of the Okanagan Valley has passed through some interesting stages. The bitter experience gained in the years 1912-15 by the lack of a proper system of organization both in the valley and in the markets, forced growers to pay particular attention to the development of this aspect of their industry. Co-operative organizations have been formed during the past few years, resulting in the use of mechanical graders and the proper wrapping and box-packing of the fruit. The question of advertising has received close attention by the co-operative organizations with the result that it may be safely stated that the product of the Okanagan Valley is now recognized as one of the highest grades of horticultural products in the markets of the prairies and the east.

In summing up, while it may be accepted that the problems of the fruit growers in the Okanagan are similar to the problems of fruit growers elsewhere, we may say that the secret of success is the practical application of efficient, scientific methods, with the necessary degree of co-operation and co-ordination of effort interlocking every phase and branch of the work.

AGRICULTURAL PRODUCTION OF CANADA

BY ERNEST H. GODFREY, F.S.S., CHIEF, AGRICULTURAL DIVISION, DOMINION BUREAU OF STATISTICS, OTTAWA

IT would seem as if, after the extraordinarily abundant season of 1915,

Nature had become somewhat exhausted through prodigality, for each of the four succeeding seasons, 1916 to 1919, were, for grain crops, continuously inferior, the yields per acre for wheat being only 17, 15½, 11, and 10 bushels per acre, as compared with 26 bushels in 1915 and with 16½ bushels, the average for the ten years 1910-19. The season of 1920, though not equal to early anticipations, came as a welcome change from the four preceding adverse years. The harvest, upon the whole, proved to be one of the best ever reaped in Canada, and has done much to bring renewed hope and confidence in these difficult times to the farming community.

Season of 1919-20

For 1919-20 the winter was one of exceptional severity, but the killing of winter-sown wheat, amounting only to 4 per cent of the area sown, proved to be the smallest on record. This was due to the depth of the snow and to the late spring, by which the young crop escaped to a large extent the damaging effects of alternate frost and thaw. The seeding season for spring grains was later than in any previous year on record, and the delay in getting on to the land caused farmers considerable apprehension; but when the season actually opened in May the weather proved so favourable that rapid progress compensated for the later start, and at the end of May the condition of the grain crops

was only slightly below average and compared quite favourably with what it was at the corresponding dates of recent years. Conditions remained favourable during June, but hot, dry weather during the earlier part of July in Saskatchewan made the situation somewhat precarious. Fortunately good rains fell during the last week of the month, just in time to effect a decided improvement in the prospects for a good wheat crop. An attack of grasshoppers threatened to assume very serious proportions in Saskatchewan, but the damage was minimized, and the worst effects were averted by an energetic poisoning campaign under Government direction.

Areas and Yields of Principal Field Crops

In the following table are given the areas sown, the total yields and the yields per acre of all the principal field crops of Canada for the year 1920, as compared with 1919. The areas are as officially estimated by the Dominion and Provincial Governments as the result of the compilation of schedules collected from individual farmers in June, and the yields for 1920 are as finally estimated by the Dominion Bureau of Statistics in co-operation and agreement with the provincial Departments of Agriculture, and, for Quebec, with the Quebec Bureau of Statistics. A column is added showing the average yields per acre for the decennial period 1910-19:—

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Field Crops	1919	1920	1919	1920	1919	1920	10-year average 1910-19
	acres	acres	bush.	bush.	bush. per acre	bush. per acre	bush. per acre
Spring wheat.....	18,453,175	17,418,241	177,254,400	243,720,100	9.50	14.00	16.50
Fall wheat.....	672,793	814,133	16,006,000	19,469,200	23.75	24.00	22.50
All wheat.....	19,125,968	18,232,374	193,260,400	263,189,300	10.00	14.50	16.75
Oats.....	14,952,114	15,849,928	394,387,000	530,709,700	26.25	33.50	33.25
Barley.....	2,645,509	2,551,919	56,389,400	63,310,550	21.25	24.75	25.75
Rye.....	753,081	649,654	10,207,400	11,306,400	13.50	17.50	16.00
Peas.....	230,351	186,348	3,406,300	3,528,100	14.75	19.00	15.75
Beans.....	83,577	72,163	1,388,600	1,265,300	16.50	17.50	16.25
Buckwheat.....	444,732	378,476	10,550,800	8,994,700	23.50	23.75	23.00
Flax.....	1,093,115	1,428,164	5,472,800	7,997,700	5.00	5.60	9.40
Mixed grains.....	901,612	811,634	27,851,700	32,420,700	31.00	40.00	33.25
Corn for husking.....	264,607	291,650	16,940,500	14,334,800	64.00	49.25	53.75
Potatoes.....	818,767	784,544	125,574,900	133,831,400	153.50	170.50	146.00
Turnips, etc.....	317,296	290,286	112,288,600	116,390,900	354.00	401.00	352.25
			tons	tons	tons per acre	tons per acre	tons per acre
Hay and clover.....	10,595,383	10,379,292	16,348,000	13,338,700	1.55	1.30	1.50
Fodder corn.....	511,769	588,977	4,942,760	5,641,750	9.75	9.60	8.85
Sugar beets.....	24,500	36,288	240,000	412,400	9.80	11.37	9.10
Alfalfa.....	226,869	238,556	494,200	583,790	2.20	2.45	2.40

From this table it will be observed that the final estimate of wheat for all Canada is 263,189,300 bushels, which is nearly 70,000,000 bushels more than in 1919, whilst the oat crop gave the truly remarkable yield of nearly 531,000,000 bushels, the largest for any one year in the history of Canada.

The bulk of the wheat crop of Canada is now produced in the three Prairie Provinces, and indeed more than half of it is grown in the single province of Saskatchewan. In the following statement is shown how the total production of wheat, oats, barley, rye, and flax is divided as between Eastern Canada, the Prairie Provinces, and British Columbia:—

Crops	Eastern Canada	Prairie Provinces	British Columbia	Total
	000 bush.	000 bush.	000 bush.	000 bush.
Wheat.....	28,177	234,138	874	263,189
Oats.....	214,750	314,297	1,663	530,710
Barley.....	22,186	40,761	364	63,311
Rye.....	2,894	8,274	138	11,306
Flax.....	409	7,589	.....	7,998

Value of Field Crops, 1920

Partly due to the war and partly to increased production, the total value of the field crops of Canada has of late years expanded annually in a very remarkable degree. At the close of the last century, the census of 1901 showed that the total value of the field crops of

Canada was \$194,953,420. It was not until 1911 that the Dominion Government began to estimate the value of field crops annually. In that year the total was not more than \$597,926,000. For 1919 the estimated total was \$1,452,437,500. For 1920 the final estimate shows the record total of \$1,455,244,050 as the value of the year's field crops. In the

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following table this sum is distributed between the various crops for 1920 with comparative figures for the two previous years:—

Field Crops	1918		1919		1920	
	Per bush.	Total	Per bush.	Total	Per bush.	Total
	\$	\$	\$	\$		
Wheat.....	2.02	381,677,700	1.89	364,857,000	1.62	427,357,300
Oats.....	0.78	331,357,400	0.80	317,097,000	0.53	280,115,400
Barley.....	1.00	77,378,670	1.37	77,462,700	0.83	52,821,400
Rye.....	1.49	12,728,600	1.40	14,240,000	1.33	15,085,650
Peas.....	2.99	12,899,100	2.86	9,739,300	2.42	8,534,300
Beans.....	5.41	19,283,900	4.48	6,214,800	3.88	4,918,100
Buckwheat.....	1.58	18,018,100	1.50	15,831,000	1.28	11,512,500
Mixed grains.....	1.14	40,726,500	1.36	37,775,400	0.90	29,236,200
Flax.....	3.13	18,951,000	4.13	22,609,500	1.94	15,502,200
Corn for husking.....	1.75	24,902,800	1.30	22,080,000	1.16	16,593,400
Potatoes.....	0.98	102,235,300	0.95	118,894,200	0.97	129,803,300
Turnips, etc.....	0.43	52,252,000	0.50	54,958,700	0.41	48,212,700
Hay and clover.....	per ton		per ton		per ton	
Grain hay.....	16.25	241,277,300	20.72	338,713,200	26.10	348,166,200
Alfalfa.....			29.00	4,379,000	33.12	4,518,000
Fodder corn.....	17.84	7,963,500	21.85	10,800,200	23.79	13,887,700
Sugar beets.....	6.15	29,439,100	6.92	34,179,500	7.75	43,701,000
Sugar beets.....	10.25	1,845,000	10.86	2,606,000	12.80	5,278,700
Total.....		1,372,935,970		1,452,437,500		1,455,244,050

By provinces, the total value for the same years is as follows:—

Province	1918	1919	1920
	\$	\$	\$
Prince Edward Island.....	16,277,800	22,067,200	18,530,400
Nova Scotia.....	42,486,200	63,086,000	47,846,550
New Brunswick.....	42,891,270	52,834,000	46,357,300
Quebec.....	276,776,900	307,944,000	330,251,000
Ontario.....	384,013,900	373,507,500	375,746,900
Manitoba.....	180,507,500	162,462,200	133,989,900
Saskatchewan.....	299,362,100	296,831,800	271,213,000
Alberta.....	113,072,700	149,580,800	204,291,500
British Columbia.....	17,547,600	24,124,000	27,017,500
Total.....	1,372,935,970	1,452,437,500	1,455,244,050

Miscellaneous Products

In addition to the field crops already described, brief mention may be made of several minor agricultural industries, which though relatively unimportant, are by no means negligible.

Great progress has of late been made in the cultivation of tobacco in Quebec, and in the southern parts of Ontario. For 1920 the area in tobacco is estimated at 53,114 acres (33,000 acres in Quebec and 20,114 acres in Ontario), as compared with a total of 31,586 acres in 1919. The yield for 1920 is estimated at 48,088,500 pounds, of the value of \$13,106,550, as compared with 33,770,000 pounds of the value of \$15,548,000 in 1919.

The cultivation of flax for fibre and of flax fibre seed for export to Ireland is a new Canadian industry, established as a consequence of the war. Including subsidiary products, the total value of fibre flax and fibre seed amounted to \$5,523,900 in 1919, as compared with \$2,285,769 in 1918.

In Ontario there are three sugar factories which manufacture sugar from Canadian grown beets. During the last few years, the acreage and production have increased considerably. In 1918 the production of refined beetroot sugar amounted to 50,092,835 pounds the highest on record, and representing a growth from 21,329,689 pounds in 1911. In 1919 the production was 37,839,271

pounds. The value was \$4,358,077 in 1918 and \$3,924,411 in 1919, the whole-sale price per pound being therefore 8.7 cents in 1918 and 10.4 cents in 1919.

Maple Sugar is a valuable by-product of Canadian farming, especially in Quebec and Ontario. There are no official annual estimates of production; but experts place the output at something less than 20,000,000 pounds of which about three-quarters are produced in Quebec. For 1920, the Quebec Bureau of Statistics places the production of maple sugar at 15,615,141 pounds, as compared with 12,155,448 pounds in 1919, and of maple syrup at 1,449,649 gallons, as compared with 1,470,775 gallons in 1919. The total industry in Canada represents an annual value of about \$2,000,000 and is carried on by about 50,000 growers.

The commercial production of apples in Canada for the year 1919 is officially placed at 3,334,660 barrels of the value of \$24,396,210, distributed by provinces as follows: Nova Scotia, 1,600,000 barrels, value \$9,989,680; New Brunswick, 40,000 barrels, value \$307,400; Quebec, 70,500 barrels, value \$527,950; Ontario, 878,860 barrels, value \$7,030,880 and British Columbia, 745,300 barrels, value

\$6,540,300. Fruit trees, bushes and plants were sold by nurserymen in Canada in 1919 to the value of \$227,627.

A recent bulletin of the Dominion Bureau of Statistics states that the total value of the fur-farming industry of Canada in 1919 was \$3,978,026, comprising \$878,568, the value of land and pens, and \$3,099,458, the value of fur-bearing animals. The total number of pelts produced by Canadian fur farms in 1919 was 2,548 of the value of \$508,079, the number from Prince Edward Island alone being 1,570 of the value of \$368,654.

The total value of the products of the dairy factories of Canada in 1919 amounted to \$135,196,602, as compared with \$107,340,850 in 1918.

Farm Live Stock

On November 3, the Dominion Bureau of Statistics reported the numbers of farm live stock in Canada as at June 15 last. The following table gives the total of each description (horses, cattle, sheep, swine and poultry) in 1920, as compared with the two previous years.

Description	1918	1919	1920
	No.	No.	No.
Horses.....	3,609,257	3,667,369	3,400,352
Milch Cows.....	3,538,600	3,548,437	3,530,238
Other Cattle.....	6,507,267	6,536,574	5,947,142
Total Cattle.....	10,045,867	10,085,011	9,477,380
Sheep.....	3,052,748	3,421,958	3,720,783
Swine.....	4,289,682	4,040,070	3,516,678
Poultry:			
Hens.....	31,334,498	31,785,722	25,942,105
Turkeys.....	1,061,982	839,711 ¹	791,766 ¹
Geese.....	879,177	802,869 ¹	754,455 ¹
Ducks.....	884,034	777,692 ¹	617,638 ¹
Total Poultry.....	34,159,691	34,645,238 ²	30,505,819 ²

¹ Not including Alberta. ² Including 439,244 other than hens in Alberta.

³ Including 2,399,855 poultry of all kinds in Alberta.

For all descriptions of farm live stock, excepting sheep, the numbers of live stock in 1920 were less than in 1919. Sheep, which for so many years before 1917, were declining in numbers, show a further satisfactory increase, the number 3,720,783, constituting an advance

of 298,825 over last year's record total of 3,421,958. Comparing the numbers of all live stock in 1920 by provinces, Prince Edward Island showed an increase for all descriptions. In the other provinces horses show a decrease in all provinces, except British Columbia,

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where the number is 44,070, as compared with 43,717. Cattle show a decrease in all provinces, except Prince Edward Island. Sheep have increased in all provinces, excepting Manitoba. Poultry, including all descriptions, have increased in Prince Edward Island, Manitoba and British Columbia, but have declined in Nova Scotia, New Brunswick, Quebec, Ontario, Saskatchewan and Alberta.

The total value of the farm live stock of Canada (horses, cattle, sheep and swine) in 1919 was estimated at \$1,296,602,000. For 1920 the total value is \$1,041,246,000, comprising \$361,328,000 for horses; \$282,419,040 for milch cows; \$279,080,960 for other cattle; \$37,263,000 for sheep, and \$81,155,000 for swine.

The value of farm poultry in 1920 is estimated at \$37,016,000.

Total Value of Agricultural Production, 1920

Using the data available for the purpose, it may be roughly calculated that the gross value of the agricultural production of Canada for the year 1920 amounts to about \$1,976,168,000, made up of the following items: Field crops, \$1,455,244,000; year's revenue from farm animals, including wool, \$151,924,000; dairy products, \$256,000,000; fruits and vegetables, \$40,000,000; poultry and eggs, \$50,000,000; miscellaneous, including tobacco, flax and maple products, \$23,000,000.

CANADA'S MEAT INDUSTRY

CANADA'S meat-packing industry had a record year in 1919, according to the report recently issued by the Dominion Bureau of Statistics. The total value of products was placed at \$233,936,913. The cost of materials was given as \$175,133,821, and the quantity was 778,479,174 pounds dressed weight. The number of beeves slaughtered was 694,394; sheep 523,998; hogs, 2,296,252; calves, 199,621.

Great strides have been made in the development of the industry in Western Canada. Ontario still retained the leadership by a wide margin with a total capital invested of \$50,232,669; Alberta is credited with \$17,598,091; Quebec, \$10,613,712; Manitoba, \$9,059,507; British Columbia, \$3,045,808, and Saskatchewan, \$2,170,533. Of the 82 plants from

which returns were received, 28 were in Ontario, 15 in Quebec, nine in Prince Edward Island, seven in Alberta and Manitoba, six in British Columbia and in New Brunswick, and two in Saskatchewan. The total capital invested was given as \$93,363,791.

The number of employees was 11,770 male and 1,452 female, and the total salaries and wage was \$15,302,388. The cost of fuel used was \$1,033,913.

Products

The quantity and the selling value at the factory or works of the meats, fresh, cured and canned, and of all by-products of the industry are given in the accompanying table.

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Classes of products.	Quantity	Value
Meats sold fresh—		
Beef.. (lbs)	317,467,956	\$ 57,581,831
Mutton.. "	22,553,283	5,068,615
Pork.. "	53,343,432	14,776,888
Veal.. "	20,309,526	3,698,402
All other.. "	1,167,010	328,994
Meats, cured—		
Beef, salted or cured.. "	12,105,182	2,203,225
Pork, salted.. "	90,379,798	27,659,867
Hams.. "	76,302,075	25,928,198
Shoulders.. "	17,603,271	4,931,363
Bacon and sides.. "	84,294,846	31,212,706
Sausage, fresh and cured.. "	27,151,818	6,712,217
Canned goods.. "	18,397,335	7,649,013
Lard.. "	41,894,907	12,623,265
Tallow.. "	14,219,539	2,555,109
Oleo and other oils.. (gals.)	1,791,438	752,689
Oleomargarine.. (lbs.)	10,084,377	2,655,181
Stearine.. "	173,167	45,914
Animal tankage.. (tons)	19,769	893,225
Bone, raw, ground, etc.. "	9,836	590,058
Complete fertilizers.. "	3,506	405,505
Glue.. (lbs.)	252,778	45,268
Gelatine.. "	5,625,403	1,758,700
Hides (581,012).. "	31,239,916	9,649,120
Skins, sheep.. (no.)	436,713	1,225,243
Skins, calf.. (no.)	169,318	1,263,379
Wool.. (lbs.)	16,044	9,513
Hair.. "	802,396	39,248
All other products..		12,164,441
Received for custom or contract work..		9,736
Total selling value..		\$233,936,913

UNITED STATES CROP SUMMARY FOR 1920

Crop.	1920.	1919.	1914-18. Average
Corn.. (bush.)	3,232,367,000	2,858,509,000	2,760,484,000
Oats.. "	1,526,055,000	1,231,754,000	1,414,558,000
Wheat.. "	787,128,000	934,265,000	822,246,000
Barley.. "	202,024,000	161,345,000	214,819,000
Rye.. "	69,318,000	88,909,000	59,933,000
Buckwheat.. "	13,789,000	15,244,000	15,305,000
Flax seed.. "	10,990,000	7,661,000	12,922,000
Potatoes.. "	430,458,000	355,773,000	382,113,000
Clover seed.. "	1,760,000	1,341,000	.....
Hay.. (tons)	108,233,000	109,152,000	99,304,000
Sugar beets.. "	8,545,000	6,421,000	6,050,000
Tobacco.. (lbs.)	1,508,064,000	1,454,725,000	1,187,708,000
Apples.. (bbls.)	80,000,000	51,000,000	74,000,000

STALLION ENROLMENT, 1920

Pure Breeds	P. E. I.	N. S.	N. B.	Que.	Ont.	Man.	Sask.	Alta.	B. C.	Breed Totals
Clydesdale.....	21	36		100	930	491	998	387	4	2,967
Fercheron.....	4	7		113	325	310	784	471	4	2,018
Shire.....				2	32	10	27	42		113
Suffolk.....				1	4	7	18	19		39
Belgian.....				65	22	53	186	109		435
French Draft.....		2		69	11	3				85
French Canadian.....		35		69	240	17	25	9		411
Standard Bred.....	16			1	16	1	2	4	1	24
Thoroughbred.....		2		11	36	5	6	2		62
Hackney.....		1		2	2	1	2	1		9
French Coach.....				2	8	2	2			14
Saddle Horse.....										
American Trotting.....										
Morgan.....				1				1		2
Irish Hunter.....										
Ponies and Morgans.....					5					5
Jacks.....										
Interim Enrolment Certificates—Pure-bred							2,050	315		2,485
Totals.....	41	83	120	436	1,631	900	4,100	1,360	8	8,679
Grades.....	37	42	5	554			252	204	2	1,096
Interim Enrolment Certificates—										
Grades.....								75		75
Scrubs.....										
Total number of horses enrolled in each province.....	78	125	125	990	1,631	900		1,639	10	9,850

A CAMPAIGN FOR TREE PLANTING

CANADIAN FORESTRY ASSOCIATION

On the Prairies

The Canadian Forestry Association's novel scheme for rallying the interest of the prairie farmers in the planting of trees by sending a travelling moving picture show through the West has met with uncommon success. The "Tree Planting Car" consisted of an ordinary railway coach, equipped with motion picture machine. The car served as an auditorium capable of seating about one hundred persons. During the trip, lectures were given at 95 points. The work was in charge of Mr. Archibald Mitchell, who gives the following account of the campaign.

"We have just about reached the summit of our trip across the prairie and back, and are now turning our faces eastwards for a few months of work in Saskatchewan and Manitoba. So far, we have met some five thousand people in meetings in the car and scores besides, singly or in groups, all interested in tree growing on the prairie in some of its phases. Very rarely indeed have the meetings not begun on time, and often six o'clock has found us still discussing somebody's tree problem after the three o'clock meeting, and many a time the eight o'clock gathering has closed at eleven or half-past.

"Interest? There is no end to the interest; people are hungry for tree and plant information. The questions asked are both numerous and varied and range from the depth to sow Caragana seed to what to do with a plantation when the grass has taken possession of it, or 'Why is it my house plants don't grow?' 'What varieties of apples and crabs would you advise for this country?' and 'Why is it the evergreens I transplanted from the hills did not grow?' or 'How would you set about planting a shelter belt across the farm?' Some were not easy to answer at first, but usually a few questions are enough to get at the root of the trouble, and we have always managed to find some solution that seemed to fit the matter in hand. It is interesting, too, how one's theories are confirmed time and again by some one who has reached the same result by following the same processes as we have been advocating. Such testimony is very valuable, and never fails to impress. It is at the same time very encouraging to the speaker.

Is the Dry Prairie Fatal?

"A very striking instance of this occurred at Lethbridge, where Mr. N. J. Anderson, of Barnwell, confirmed all we had said

regarding the possibility of growing trees on the dry prairie. Some people in the irrigated sections especially are very sceptical as to dry land tree growing, more particularly in the last three or four years, when everything has been so dry, and it was refreshing, to say the least, when Mr. Anderson was able to endorse everything we had been saying. Trees do so well with irrigation, planted even singly, and with very little cultivation afterwards, that the tendency is to expect the dry land trees to succeed in the same way, and with little or no attention afterwards, a mistake which is fatal every time.

A Real Success

"A visit to Mr. Anderson's place on our way to Taber bore out everything he had said. His trees were obtained from the Government, the same as anybody else could get. They were planted in 1917, just at the beginning of the dry years, and yet he had a full stand, nearly every tree growing, many of them 14 feet high now, a splendid example of what can be done in a very short time by carrying out instructions and using a little energy and common sense. On inquiry, it was found he had made a perfect summer-fallow preparation, having ploughed the land deep about the end of May, the year previous to planting, and keeping it well tilled all summer. The years 1918 and 1919 were dry, but Mr. Anderson believed in the irrigation of the cultivator, and persevered, keeping the ground stirred all summer and free from weeds. The result is those trees have grown to all appearance as well as if the usual rainfall had taken place. Fourteen feet high is as good as can be expected in any three years with normal rainfall without irrigation, and is enough to satisfy anybody. The whole plantation is a demonstration of what can be done in tree growing, even in dry years, when correct methods are carried out.

Aiding Town Schemes

"Every town or village has its own local tree problem; sometimes the wrong trees are being used; sometimes they are being injured by a too frequent use of the sprinkler, actually being injured by kindness, and sometimes attacks of insects or fungus do damage. At every place we try to go through the town before the first meeting, taking in the local tree troubles and successes, so that we can speak intelligently on whatever may turn up, and advise accordingly.

"We have seen a great deal of damage from soil-drift in our travels, and whenever that is mentioned it is not difficult getting people's attention.

Crops Blown Out

"Mr. Anderson's plantation is a striking example of the advantages of tree belts in checking soil-drift. His trees are in three belts, about 40 rods apart, running north and south. Immediately west of the outer one there is a crop of flax which is the result of the third seeding this year, the two previous crops being blown away completely. For six miles west of him the crops and soil were completely blown away, and yet no drift passed through the third strip to his house and garden. His belts are too narrow for perfect success as self-sustaining plantations on dry land, being only 3 to 6 rows wide. If they had been six rows wide, little or no drift would have passed through the first one, and the whole field would have been completely sheltered.

"Three other well-treed places were passed on the way to Taber—standing

rebukes to every other farm in the vicinity and shining examples of what can be done even in the driest year on the prairie in the way of tree growing.

Time Lost, Time Gained

"During the whole trip we did not hear a man question the fact that trees would help the country—help it in retaining snow in winter and prevent evaporation in summer, afford shelter from the winds and help to keep the land inside the fences.

"Of this there is never any doubt, the question is to find the time; and when the method of planting two acres of tree easily, quickly and well, is presented, it leaves them thinking. They see it, and they also see that two or three days taken from the middle of their wheat seeding is not time lost.

"The truth is, the people are really tree hungry, but like everything else one does not understand, they are afraid to tackle it. They forget that the planting of a tree belt is, after all, only a short job; but it is a completed job, and the time taken will never be missed out of the year's work."

NEWS ITEMS AND NOTES

The National Dairy Council of Canada announces a propaganda to educate the public so that they will know and appreciate the fact that milk and its products are among the best and cheapest foods in the world. The council believes that the public should be made to understand that healthy children cannot be reared unless they are given lots of milk to drink and plenty of the products of milk to eat; and that grown people, to enjoy good health, should use milk or its products abundantly in their every day diet. While this work will result in much benefit to the health and well being of the Canadian people, it will also develop a much larger and steadier home market for milk, cream, butter and cheese.

The Council has engaged Miss Olive E. Hayes, a Canadian lady who has had special training and experience as a speaker and writer on the food values of dairy products, to take charge of its educational and publicity department. The Council, through this department, will assist and co-operate with Public Health Associations, Child Welfare organizations, and other kindred societies in campaigns of addresses to school children, women's clubs, public meetings and newspaper articles to bring about a greater

consumption of the health-giving and health-preserving foods which milk and its products have proved to be. Miss Hayes will commence her work on the 1st of March, 1921. It is expected that several child welfare and public health organizations of Toronto, with the co-operation of this Council, will put on a milk campaign in that city in March next. Whenever, in any part of Canada, there is a desire to have a milk campaign, the Council will be glad to assist and co-operate in making a success of the movement. The offices of the Council are in the Central Chambers, Ottawa.

The Chancellor of the Exchequer recently announced in the British House of Commons that the Ministry of Food would be disbanded at the end of March, and it is thought that this will be the last of food control in the Old Country, for the present at any rate.

In the January-February edition of the Agricultural Gazette an article entitled "Relation of Birds to Crops" was credited to Miss Ruby Mills, Secretary of the Hamilton Bird Protection Society. This article

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was prepared by Miss Laura B. Durand, Secretary of the Canadian Society for the Protection of Birds, and was read before the Wentworth Teachers' Convention in October last.

Miss Durand has just returned from a month's field work in Wentworth and Halton counties, where she gave 39 addresses in the rural schools on the subject of bird protection.

Dr. F. C. Harrison, Principal of Macdonald College, was elected as President of the Society of American Bacteriologists, at the annual meeting held at Chicago, Dec. 28-30, 1920. The Society has a membership of about one thousand.

Professor H. Barton left Macdonald College on Jan. 21, for Ayr, Scotland, where he goes at the invitation of the Ayrshire Cattle Herdbook Society of Great Britain and Ireland, to judge at their fair.

The necessity of a campaign of unvarying efficiency against the common brown rat is an outstanding one, states W.B. Bell, of the United States Biological Survey, in an article entitled *The Rat—A World Menace*, appearing in the Weekly News Letter of the United States Department of Agriculture. No other animal or insect, continues the writer, is so dangerous and persistent an enemy, and no other enemy succeeds in inflicting the damage that the rat annually imposes upon humanity. The rat population of the United States is at least equal to the human population, and the same ratio holds true for practically every country under the sun. The Bureau of Biological Survey, places the value of the food and property destroyed annually by each individual rat at \$2. Keeping well within the boundaries of conservatism this means that each year, in that country alone, is produced \$200,000,000 worth of food to no other purpose than to feed rats. In another way 200,000 men in the United States are devoting all their labor to the maintenance of 100,000,000 rats.

The year 1920 was the most successful in the history of the school exhibition movement in Saskatchewan, 250 fairs being held, an increase of .43 over the year previous.

The Department of Agriculture for Saskatchewan reports that in 1920 there were 1798 schools entered in gopher destruction contests; that 2,019,233 gophers were destroyed at a cost of \$3,159.

The School Gopher Contests conducted for four years by the Saskatchewan Department of Agriculture will this year be discontinued. They resulted in the destruction of millions of gophers, but have served their purpose as a medium whereby the children of the rural schools might contribute to the saving of food during the war period.

As a means of popularizing Canadian fruits in Britain, the proposal has been made that a "Canadian Fruit Week" be held this year, according to a report of J. Forsyth Smith, Fruit Trade Commissioner to the Department of Trade and Commerce, from London. Mr. Smith also states that a national apple day may be held as a part of a general campaign of advertising.

Brown-tail Moth work started in Nova Scotia on December 1, 1920. Two Dominion and two provincial scouts are engaged on the work, which is carried on under the direction of Mr. F. C. Gilliatt, as general foreman. A severe outbreak was found at Bridgetown, which fortunately appears to be local in character.

The first consignment of nursery stock from Europe for British Columbia via the Panama Canal arrived at the port of Vancouver on December 28. The shipment arrived in a very poor condition due to over heating and the plants were practically valueless.

Dr. J. H. McDunnough has been appointed editor of "The Canadian Entomologist" in place of Dr. E. M. Walker, of the University of Toronto, who has resigned owing to pressure of university work.

The live stock breeders of Oxford county Ontario, have organized a Stock Improvement Association as a branch of the Ontario Cattle Breeders' Association, with the object of getting rid of the scrub sire. As soon as possible a census of all scrub bulls in the county will be taken, and then more definite plans will be made for their substitution by pure-bred animals. G. R. Green of Woodstock is Secretary-Treasurer.

Loans aggregating to \$80,302,649 have been made to 19,931 soldiers in the Dominion. Courses in agriculture have been completed by 1,500 prospective veteran settlers, and 916 men are still in training.

The Dairy and Cold Storage Branch of the Federal Department of Agriculture was represented at the convention of the

Eastern Ontario Dairymen's Association at Cobourg, in January, by Messrs. J. A. Ruddick, Commissioner; George H. Barr, Chief Dairy Division, H. W. Ccleman, Dairy Produce Grader, and A. H. White, Senior Dairy Promoter. Mr. Ruddick gave an address on the Official Grading and Control of Dairy Produce for Export.

Messrs. Ruddick, Barr and White were also in attendance at the convention of the Western Ontario Dairymen, held at London, and delivered addresses.

At the convention of the Nova Scotia Dairymen at Bridgetown, in January, Mr. Ruddick gave an address on the Progress of the Dairy Industry, and Mr. Barr on the Dominion Educational Butter Scoring Contest.

At the Charlottetown convention of Prince Edward Island Dairymen, Mr. Ruddick spoke on the Progress of Dairying.

Mr. E. S. Archibald, Director of Experimental Farms, was present at the annual convention of the Dairymen's Association of Eastern Ontario on January 6, and gave an address on "The Cost of Milk Production." Mr. Archibald also attended the Western Dairymen's Convention at London on January 12, and spoke upon the subject of "The Economic Feeding of Dairy Cattle."

Mr. Arthur Gibson and Dr. J. M. Swaine represented the Entomological Branch at the meetings of the Entomological Society of America and the American Association of Economic Entomologists held in Chicago, Ill., December 26-31, in affiliation with the American Association for the Advancement of Science. Mr. Gibson was elected first vice-president of the Entomological Society of America and was elected to a similar office in the American Association of Economic Entomologists. The A.A.A.S. meetings will be held in Toronto this year, and it is expected that arrangements will be made to hold joint meetings of the above two Societies and the Entomological Society of Ontario.

Mr. Arthur Gibson, Dominion Entomologist, has recently been appointed a member of the Advisory Board on Wild Life Protection. Mr. Gibson will represent the Department of Agriculture on the Board.

Mr. Arthur Gibson, F.E.S., F.E.S.A., Dominion Entomologist, recently attended a joint meeting of the Montreal Entomological Society and the Montreal Natural History Society, and gave an illustrated talk on the work of the Entomological

Branch of the Dominion Department of Agriculture.

At the Annual Convention of the Western Canada Fruit Jobbers' Association held in Winnipeg, January 12 and 13, R. G. L. Clarke, District Fruit Inspector for B. C. and Mr. F. H. Steele, District Fruit Inspector for the Prairies, represented the Dominion Fruit Branch.

Mr. C. W. Baxter, Dominion Fruit Commissioner, addressed the Nova Scotia Fruit Growers on "Marketing and Distribution" at the Annual Meeting held at Windsor in January.

Mr. R. G. L. Clarke, District Fruit Inspector for British Columbia, represented the Fruit Branch at the Annual Meeting of the British Columbia Growers, held at Nelson, B. C., January 19-21.

The Dominion Chemist, Dr. Frank T. Shutt, addressed the annual meeting of Dominion Land Surveyors held in Ottawa on February 2 and 3, 1921, on the subject "Soils and their Characteristics."

The Annual Convention of the Manitoba Beekeepers' Association held in Winnipeg on January 18, was attended by Mr. F. W. L. Sladen, Dominion Apiarist, who gave two addresses, entitled "The Reduction of Labour in the Prevention of Swarming," and "Bee Diseases."

Mr. M. B. Davis, B. S. A., Assistant in Pomology at the Experimental Farms Branch, attended the annual convention of the Nova Scotia Fruit Growers' Association on January 19, and addressed the gathering on Orchard Pruning and Fertilization. A summary of Mr. Davis' paper on pruning will be found in this issue.

The annual meeting of the Ontario Horticultural Association, held at Toronto in February, was attended by Mr. W. T. Macoun, Dominion Horticulturist, who presented the report of the Committee on "Names and Varieties."

"Work in Pomology at the Central Experimental Farm and its value to farmers and fruit growers of Eastern Ontario," was the subject of an address at the Agricultural School, Kemptville, Ontario, given recently by the Assistant in Pomology, Mr. M. B. Davis.

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The Dairymen's Convention of the district of Beauharnois held at Ormstown, Que., on January 11, was attended by the Dominion Live Stock Commissioner, Mr. H. S. Arkell, who addressed the meeting on the "Possibilities of Dairying."

The Dominion Live Stock Commissioner was represented at the annual meeting of the Live Stock Associations of the Province of Manitoba, held at Brandon early in January, by Mr. C. M. MacRae, B.S.A., who spoke upon the subject "Federal Assistance to Horse Breeding."

Mr. George B. Rothwell, Dominion Animal Husbandman, addressed the convention of the Beauharnois Breeders' Association held at Ormstown, Que., on January 11, on "Improving the Dairy Herd."

Mr. Grant S. Peart, Chief, Markets Intelligence Division of the Seed Branch, Dominion Department of Agriculture, attended the meetings of the Ontario Experimental Union at Guelph on January 11 and 12, giving an address entitled "An Analysis of Sweet Clover Seed Markets."

Over twenty-five per cent of the elementary schools in New Zealand are provided with facilities for the instruction of girls in household science.

In view of the decision of the Ontario Minister of Agriculture to transfer the Ontario Veterinary College from Toronto to Guelph, arrangements are being made to proceed with the new building when spring opens. The plans have been approved for a structure costing \$200,000. It is believed that the change which will bring the institution into close touch with the Ontario Agricultural College, will result in a better co-ordination of work and add to efficiency.

A new Dairy Building and a Memorial Hall will be added to the Agricultural

College buildings in the near future. The dairy building will serve the purpose of a Dairy School and will be up-to-date in all respects. The Memorial Hall, the cost of which is being met by private subscription, will be an imposing structure and will appropriately commemorate the many students and ex-students of the institution who lost their lives in the World War.

The annual convention of the Ontario Fruit Growers' Association, held at Toronto on February 16 and 17, was attended by Mr. C. W. Baxter, Fruit Commissioner, who spoke on the establishment of an Ontario Sales' Agency for apples.

Mr. G. E. McIntosh, Fruit Transportation Specialist, was also in attendance and addressed the convention on the subject of "Carriers' Protective Service." Mr. Baxter states that the conference was one of the most successful in many years.

The Dominion Department of Agriculture was represented at the official opening of the Kemptville Agricultural School by the Director of Experimental Farms, Mr. E. S. Archibald. Mr. Archibald also addressed the gathering of short course students in the afternoon.

Mr. G. E. McIntosh, Fruit Transportation Specialist of the Dominion Department of Agriculture delivered an address at the annual convention of the Niagara District Fruit Growers' Association February 23 to 25, dealing with the question of the distribution of Ontario fruits and the extension of markets.

On page 79 of the Agricultural Gazette' last issue, it is mentioned that the team representing the University of British Columbia in the Judging Competition at the Pacific International at Portland was in charge of Professor Clement. Professor King, who is now Acting-Head of the Department of Animal Husbandry, should be given credit for this work.

APPOINTMENTS AND STAFF CHANGES

DOMINION DEPARTMENT OF AGRICULTURE

Dr. F. C. Craighead, late of the Bureau of Entomology, Washington, D.C., arrived in Ottawa at the beginning of the New Year to take up his duties as Entomologist in the Division of Forest Insects, Entomological Branch.

Dr. A. E. Cameron resigned from the Entomological Branch, as from October 1, 1920, to accept the Professorship of Zoology at the University of Saskatchewan.

Mr. Wilfred H. Wright, B.S.A., was appointed early in January as Supervising Seed Analyst at Calgary. At the Ontario Agricultural College, Guelph, from which he graduated in 1912, Mr. Wright specialized in Biology. He enlisted with the 153rd Battalion, but sustained injuries that left him unfit for service in France. He was later given charge of the Battalion Schools at Shorncliffe, and after his return to Canada in February, 1918, was made Lecturer in Botany at the Ontario Agricultural College.

Mr. Frank E. Foulds, B.Sc. (Agr.) has been appointed Supervising Seed Analyst at the Dominion Seed Laboratory, Winnipeg. Mr. Foulds took a combined course in Arts and Agriculture at McMaster University, Toronto, and the Ontario Agricultural College, Guelph. He graduated in 1916, was with the Dominion Laboratory of Plant Pathology at St. Catharines, Ontario, for several months, and then enlisted. Following demobilization, he attended Faculty of Education at the University of Toronto, and has recently been in charge of the Science and Agriculture Department at the Clinton Collegiate Institute.

Mr. A. C. McCulloch has severed his connection with the New Brunswick Department of Agriculture, where for some time past he has been Superintendent of the Poultry Division, and has been appointed to the position of Poultry Promoter for the Live Stock Branch in Manitoba.

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Mr. L. G. Heimpel, B.S.A., who has been on the staff at the Kemptville Agricultural School as instructor in Farm Mechanics and Drainage, resigned his position on February 12, to take the position of agricultural advisor with the Fordson Tractor Company.

NEW BRUNSWICK

The appointment of Mr. Harvey Mitchell as Deputy Minister of Agriculture for New Brunswick was announced at the first of the New Year. Since March 31 of last year, when he resigned his connection with the Federal Dairy Division, Mr. Mitchell had given his attention to his farm at Keswick, from whence he was called to oversee the department with which he had formerly been connected as Dairy Superintendent.

His record as a promoter of the dairy industry in the Maritime Provinces dates back to 1894. In that year, Mr. Mitchell joined the staff of the New Brunswick Department of Agriculture as Dairy Superintendent, which position he filled until 1907, when he became Maritime Representative of the Dairy Division, Ottawa. In 1896, he introduced the co-operative plan of operating cheese factories and creameries in New Brunswick; also the division of proceeds according to percentage of butter fat. Previous to this, the milk was practically all bought outright and paid for at a stated price per one hundred pounds, regardless of fat content.

On becoming Maritime Representative of the Dairy Division in 1907, he introduced Cow Testing for the improvement of dairy herds in his territory. From 1907 until 1916, he continued to supervise Cow Testing in Nova Scotia, New Brunswick and Prince Edward Island. During this period Mr. Mitchell assisted in the establishment of central creameries in Nova Scotia and Prince Edward Island. The years 1915-16 were spent in carrying out a special propaganda for an improvement in the quality of Prince Edward Island cheese.

In 1917, Mr. Mitchell carried the gospel of the necessity for manufacturing a better class of cheese to the cheese makers, factory owners and patrons of cheese factories in New Brunswick. The New Brunswick cheese manufacturers fell into line and there was soon a decided improvement in quality, and an improved system of marketing was introduced. During these years Mr. Mitchell also helped very materially in establishing central creameries at Moncton and St. Hilaire, N.B."

No one knows the needs of the farmers of New Brunswick better than Mr. Mitchell. He is a farmer and the son of a farmer.

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He knows every section of the province, and he comes to the department possessing the good will of every member of the staff.

Mr. J. H. Hoyt, who has been Assistant to the Director of Elementary Agricultural Education, Sussex, has been transferred to the staff of District Agricultural Representatives, with headquarters at Bathurst, Gloucester county, N.B.

MACDONALD COLLEGE

The Biology department, Macdonald College, has been divided into two:—the department of Entomology and Zoology, under Professor William Lochhead, and the department of Botany, under Professor B. T. Dickson.

Dr. G. P. McRostie has been appointed Assistant Professor in the Cereal Husbandry department of Macdonald College, in charge of grass and clover investigations. Dr. McRostie graduated from the Ontario Agricultural College in 1912, and after serving with the Ontario Department of Agriculture as agricultural representative for a time, took up post graduate work at Cornell University, from which he received the degree of Doctor of Philosophy in 1919. At Cornell he majored in Plant Breeding and Plant Pathology, and did special work in breeding beans for disease resistance.

Mr. Walter Biffen, B.Sc., N.D.D., has been appointed lecturer in the department of Botany. Mr. Biffen graduated from the University of Wales in 1906 with B.Sc.,

in agriculture, and the following year completed the N.D.D. at Midland College. For three years he was research assistant in the Imperial Department of Agriculture for the West Indies. Later he taught at Aberystwyth University and Tamworth Agricultural College. He will teach part of the courses in Botany and will also engage in research work.

Miss Anita E. Hill, Head of the School of Household Science since 1917, and a member of the staff for several years previous to that, resigned her position some months ago. Miss Bessie M. Philp, Instructor of the Household Science staff since 1914, has been appointed to succeed Miss Hill.

Miss M. M. Chute, who, since August 1919, had been in charge of the Extension Work of the School of Household Science, gave up this position in September, 1920, to accept an instructorship on the staff of the School. Miss Chute's post as Superintendent of Women's Institutes of Quebec was taken over in January, 1921, by Miss Della E. Saunders of Florenceville, N.B. Miss Saunders is a graduate in Household Science of Acadia Ladies' Seminary and for some years has been connected with Women's Institute work in P.E.I., being Superintendent for the past two years.

Miss Eleanor B. Ament of Rochester, N.Y., was appointed in October, 1920, to take charge of the Dressmaking Department in the School of Household Science. Miss Ament is a graduate of Mechanics Institute Rochester, N.Y., and since completing her course, taught in McKeesport, Pa.

MEETINGS OF ASSOCIATIONS, 1921

March 2. The Annual Meeting of the Royal Agricultural Winter Fair Association of Canada, Toronto. C. F. Bailey, Toronto, is Managing Director.

March 2-3. Alberta Provincial Horse Cattle, Sheep and Swine Breeders' Associations. W. J. Stark Secretary, Edmonton.

March 8-10. Regina Cattle Sale.

March 16-17. Manitoba Winter Fair, Brandon.

March 18. Manitoba Association Cattle Sale, Brandon.

March 23. Canadian Ayrshire Breeders' Annual meeting, Montreal.

April 4-9. Alberta Spring Horse Show at Calgary. E. L. Richardson, Secretary.

April 5-8. Alberta Cattle Breeders' Association at Calgary. Annual auction sale and show of pure bred bulls; beef breeds. E. L. Richardson, Secretary, Calgary, Alta.

April 6. National Dairy Council, Toronto. Secretary, D'Arcy Scott, Ottawa.

April 11-16. Alberta Spring Show—Boys' and Girls' Competition, Edmonton.

May 25-27. Alberta Cattle Breeders' Association at Calgary. Annual auction sale and show of pure bred cattle; beef Breeds. E. L. Richardson, Secretary.

ASSOCIATIONS AND SOCIETIES

WESTERN CANADIAN SOCIETY OF AGRONOMY

The Western Canadian Society of Agronomy met at the University of Alberta, Edmonton, on December 28, 29 and 30, 1920, for its first regular annual meeting.

The object of the Society is the encouragement of investigational work in crops and soils and to disseminate knowledge concerning both; to secure the highest standard of instruction in agronomy at all agricultural educational institutions in the prairie provinces; to unify and standardize as much as possible the methods used by the different investigators throughout the Middle West in Canada.

The Department of Agriculture of Alberta has consented to publish the papers delivered at the conference in bulletin form for distribution among the members of the Association, while those of special interest to farmers will be published in a separate bulletin for free distribution.

The executive elected to carry on the work of the organization through the year 1921 are as follows:—

President: Prof. T. J. Harrison, Manitoba Agricultural College; Vice-President, Prof. G. H. Cutler, University of Alberta; Secretary-Treasurer, Prof. R. Sansen, University of Saskatchewan; F. S. Grisdale, Principal Olds Agricultural School; W. C. McKillican, Superintendent Experimental Farm, Brandon, Man.

The following resolutions were adopted:—

1. Resolved that it is the unanimous opinion of the members of the Western Canadian Society of Agronomy that one of the most urgent needs in agriculture of the prairie provinces is the inauguration of a complete soil survey.

2. Resolved that in order that undue duplication of effort be avoided, and that the highest standard of work be achieved, that the members of the W.C.S.A. strongly urge more and more co-operation among the agronomists in the three prairie provinces in solving problems of common interest.

3. Resolved that whereas seeding down to grass is a recognized means of reclamation and prevention of soil drifting, and that whereas the more acute the problem, the more difficult it is to get grass crops to grow, and whereas there has not been sufficient experimental work done to solve the problem, be it resolved that the W.C.S.A.

recommend that the question of method of seeding down to grasses in drifting areas, be thoroughly investigated by further experimentation.

4. Resolved that we emphasize the importance of post-graduate work as a training for research in agriculture.

5. Resolved that as the meteorological data available in the three prairie provinces is too meagre to give the information required, the W.C.S.A. recommends that the equipment at the existing meteorological stations be increased and that new stations be located in representative areas at present unserved, and that special attention be given to evaporation, wind velocity, and barometric pressure, as well as temperature, rainfall and sunshine.

DOMINION SHORTHORN BREEDERS' ASSOCIATION

Among the resolutions passed by the Shorthorn Breeders at their annual meeting was one endorsing the campaigns now being waged against the scrub bull. The following officers were elected: President, J. G. Barron, Carberry, Man.; Vice-President, H. M. Pettit, Freeman, Ont.; Second Vice-President, Hon. Duncan Marshall, Olds, Alta.; Secretary, Professor G. E. Day.

THE CANADIAN HOLSTEIN BREEDERS' ASSOCIATION

At its annual meeting the above Association elected the following officers for the ensuing year: President, F. R. Mallory, Frankford, Ont.; 1st Vice-President, A. E. Hulet, Norwich; 2nd Vice-President, R. W. E. Burnaby, Jefferson, Ont.; 3rd Vice-President, P. J. Salley, Lachine Rapids, Que.; 4th Vice-President, Hon. Walter M. Lea, Charlottetown, P.E.I.

CANADIAN GUERNSEY BREEDERS' ASSOCIATION

At the annual meeting of the Canadian Guernsey Breeders' Association held at Amherst, N.S., the following were elected officers for 1921:—President: Capt. Hugh Dickson, Truro, N.S.; 1st Vice-President: Jas. F. Roper, Charlottetown, P.E.I.; 2nd Vice-President, R. Eric Fisher, Bolton Centre, Quebec; Secretary-Treasurer, H. W. Corning, M.P.P., Yarmouth, N.S.

CANADIAN CO-OPERATIVE WOOL GROWERS' ASSOCIATION

The following are the officers and directors for 1921: President, Col. Robt. McEwan, London, Ont.; 1st Vice-President, J. W. Renton, Calgary, Alta.; 2nd Vice-President, S. A. Logan, Amherst, N.S.; Directors, British Columbia, G. C. Gay; Alberta, Levi Harker; Saskatchewan, J. C. Beatty and G. N. Buffum; Manitoba, W. C. McKillican and Geo Gordon; Ontario, W. A. Dryden and G. L. Telfer; Quebec, J. A. McClary and George Bouchard; New Brunswick, W. E. Wallace; Prince Edward Island, W. McGregor.

CANADIAN SHEEP BREEDERS' ASSOCIATION

The following were elected officers and directors of the Canadian Sheep Breeders' Association for the year 1921: President, W. A. Dryden, Brooklin; Vice-President, H. F. Follett, Duval, Sask.; Maritime Provinces, R. B. Bishop, 85 Germain St., St. John, N.B.; Quebec, James Bryson, Brysonville; Victor Sylvestre, St. Hyacinthe; Arsene Denis, St. Norbert Station; Ontario, W. A. Dryden, Brooklin; Lt.-Col. R. McEwen, London; Geo. Telfer, Paris, and R. H. Harding, Thorndale; Manitoba, George Gordon, Oak Lake, Man.; Saskatchewan, F. H. Follett, Duval, Sask., Alberta, R. Knight, R.R. No. 1, Calgary, Alta.; British Columbia, S. F. Tolmie, Victoria, B.C.; Secretary, R. W. Wade, Department of Agriculture, Toronto, Ont.

CANADIAN SWINE BREEDERS' ASSOCIATION

The following directors have been elected for the Canadian Swine Breeders' Association for 1921. The director for Ontario will be elected later.

Alberta, W. J. Hoover, Bittern Lake; Saskatchewan, Philip Leech, Baring; Manitoba, W. H. English, Harding; British Columbia, Albert C. Marshall, South Westminster; Maritime Provinces, J. F. Roach, Sussex, N.B.; Quebec, M. Ste. Marie, Compton, Que.

THE CLYDESDALE HORSE ASSOCIATION OF CANADA

At the annual meeting of the Association, the President, Mr. James Torrance, called attention to the steady decrease in the horse population in this country and the United States, only the Province of Prince Edward Island showing any addition in the past year. In his opinion a keen shortage, almost a famine, of good heavy animals would be experienced before long, and he strongly advocated the breeding of every good mare of size in the country.

The following are the officers for the coming year:—President: James Torrance, Markham, Ont.; Vice-President: Dr. T. H. Hassard, Markham; Secretary-Treasurer: J. W. Wheaton, Toronto.

THE CANADIAN HACKNEY HORSE SOCIETY

The Canadian Hackney Horse Society at the annual meeting in Toronto, elected the following officers for 1921:—Hon.-President: Robert Graham, Toronto; President: Dr. J. W. R. Fowler, Toronto; Vice-President: H. A. M. Manson, Agincourt; Secretary: J. E. Rettie, Toronto.

THE CANADIAN SHIRE HORSE ASSOCIATION

The officers of the above association for 1921 are as follows:—President: T. D. Morden, Oakville, Ont.; Vice-President: W. J. Gardhouse, Highfield, Ont.; Secretary-Treasurer, G. D. Green, Toronto.

CANADIAN STANDARD BRED HORSE SOCIETY

The following are the officers for 1921:—Honorary President: Sam McBride, Toronto; President: F. S. Scott, M.P., Galt; Secretary-Treasurer: John W. Brant, Ottawa.

THE DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO

The convention and dairy exhibition of the Dairymen's Association of Western Ontario was held at London on January 12 and 13, 1921. The convention was well attended throughout and a fine exhibition of dairy products was a prominent feature.

Resolutions were passed tendering the thanks of the Association to the Dominion and Provincial Departments of Agriculture for assistance rendered the dairy industry, particularly in connection with the Butter Scoring Content, the educational campaign, pure bred dairy sires, the Cow Testing Campaign, and also for the Market Letters sent out by the Dairy Branch of the Federal Department.

The following are the officers for 1921:—President: J. Scott, Woodstock, Ont.; 1st Vice-President: J. N. Allen, Dunnville, Ont.; 2nd Vice-President: R. Johnston, Bright, Ont.; 3rd Vice-President: H. Mannel, Woodstock, Ont.; Secretary-Treasurer, Frank Hearn, London, Ont.

EASTERN ONTARIO DAIRYMEN'S ASSOCIATION

The following were among the resolutions adopted at the recent convention of the Eastern Dairymen's Association:—

That the Dairy Standards Act be immediately placed on the Statute Books; that the

Federal Government grade all cheese manufactured for export; The officers elected for 1921 are:—President: George Smyth, Iroquois; First Vice-President: M. N. Empey, Napanee; Second Vice-President: R. W. Ireland, Wellington; Secretary: (permanent) T. A. Thompson.

THE ONTARIO MILK AND CREAM PRODUCERS' ASSOCIATION

The Ontario Milk and Cream Producers' Association held its annual convention in Toronto on February 1, when the decision was arrived at to organize for the inclusion of all the 100,000 milk producers of the Province. Mr. E. H. Stonehouse of Weston is President; Secretary: J. P. Griffin, Toronto.

ONTARIO FAIRS ASSOCIATION

At the annual meeting of the Ontario Association of Fairs and Exhibitions the following officers were elected for the coming year:—President: W. J. Connelly, Cobden; First Vice-President: John Farrell, Forest; Secretary: J. Lockie Wilson, Toronto.

ONTARIO HORTICULTURAL SOCIETY

The fifteenth annual convention of the above society, held recently in Toronto, recommended government inspection of all imported bulbs and the examination of all domestic bulbs offered for sale.

The officers of the association for the ensuing year are:—President: Miss Mary Yates, Port Credit; First Vice-President: Rev. Wm. McKay, Weston; Second Vice-President J. P. Jaffray, Galt; Secretary and Editor: J. Lockie Wilson, Toronto.

THE POMOLOGICAL AND FRUIT GROWING SOCIETY OF QUEBEC

At the annual meeting of the above society, held in December last, a resolution was adopted recommending an extension of the area of land devoted to the breeding and testing of hardy fruits at the Central Experimental Farm.

The following are the officers for 1921:—Hon. President: Z. A. Raymond, Montreal; Hon. Vice-President: C. E. Petch, Hemmingford; President: J. H. Lavoie, Quebec City; Vice-President, J. R. Marshall, Abbotsford; Sec.-Treasurer: Peter Reid, Chateauquay Basin.

MARITIME STOCK-BREEDERS' ASSOCIATION

The annual meeting of the above Association elected the following officers for 1921:—President, A. E. Trites; Vice-President

for Nova Scotia, S. A. Logan; Vice-President for New Brunswick, A. Mcq. Avard; Vice-President, for Prince Edward Island, J. M. Laird.

NOVA SCOTIA POULTRY ASSOCIATION

The annual meeting of the Nova Scotia Poultry Association took place at the Agricultural College, Truro, on January 13. The decision was reached not to increase the number of birds in the Egg Laying Contest pens, and the Association will, therefore, forego for the present the registration of their birds in the Canadian Record of Performance. Last year some 1,500 day-old chicks were successfully imported from hatcheries for the use of members. The following officers were elected: President, W. W. Ausborne, New Glasgow; Vice-President: Edison Griffin, Port Williams; Secretary-Treasurer, J. P. Landry, Truro.

DAIRYMEN'S ASSOCIATION OF NOVA SCOTIA

At the annual convention of the above Association, held at Bridgewater on January 19 and 20, 1921, the following was among the resolutions passed:—

That the Summer Butter Scoring Competition, having served its purpose, be discontinued and that a contest of a purely educational and experimental nature, without money prizes, be substituted.

The officers elected for the coming year were: President, R. B. McLennan; Vice-President: F. A. Illsley; Secretary-Treasurer, W. A. MacKay.

THE NOVA SCOTIA FARMERS' ASSOCIATION

At the annual meeting of the Nova Scotia Farmers' Association held at Bridgetown in January last, among the resolutions passed were the following:—

That the Department of Agriculture make a survey of the agricultural conditions in the province, including information as to cost of production; that the Federal Government be urged to secure for the province immigrants with farming experience and capital; also farm and domestic help; that the Provincial Government be asked to establish a maritime dairy school; that the provincial exhibition be established at Halifax or some central point in the province.

The secretary of the Association is Chas. R. B. Bryan, Truro.

EASTERN CANADA VETERINARY ASSOCIATION

At the annual meeting of the Eastern Canada Veterinary Association held at Ottawa in January, Dr. George Hilton, Ottawa, was re-elected President, The

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Honourable S. F. Tolmie, Minister of Agriculture, was elected Honorary Patron of the Association.

THE SASKATCHEWAN CATTLE BREEDERS ASSOCIATION

The annual meeting of the Saskatchewan Cattle Breeders at Moosejaw established a record in point of attendance. The Hon. C. M. Hamilton, Minister of Agriculture, made the announcement that Saskatchewan was to have a "Better bull campaign." Each of the western provinces has been ripe for a move of this kind ever since the armistice, as a closer margin of profit calls for a better quality of cattle. Mr. Hamilton called for a greater degree of community effort in pure-bred livestock breeding. He instanced a section of the province where Shorthorns were at present exclusively raised and showed the benefits arising out of a continuation of that policy. There were, he said, other sections of the province better suited to other breeds, and in these cases likewise the effort should be concentrated upon the one kind of cattle.

Dr. Barker, of the Dominion Health of Animals Branch, read a paper on the accredited herd system, which led to the action taken regarding testing of animals sold at the provincial sales; all those sold after March must be sold subject to a 60-day retest.

A resolution was passed asking for the establishment of a veterinary research laboratory at the Indian Head Experimental Farm.

SASKATCHEWAN LIVE STOCK CONVENTION

The following were the officers elected for 1921 at the convention of the under-mentioned associations held at Moosejaw in January last—

Horse Breeders' Association:—President, Swanton Haggerty, Belle Plain; Vice-President, George Rupp, Lampman.

Cattle Breeders' Association:—President, James Browne, Newdorf; Vice-President, R. W. Wright, Drinkwater.

Sheep Breeders' Association:—Hon. President, A. J. Quigley, Sintaluta; President, H. H. Follet, Duval; Vice-President, J. N. Buffum, Bechard.

Swine Breeders' Association:—President, S. V. Tomecko, Lipton; Vice-President, C. W. Thurston, Regina.

The secretary of the above Association is J. G. Robertson, Regina.

CENTRAL ALBERTA CATTLE BREEDERS

An association known as the Central Alberta Cattle Breeders' Association was formed at Lacombe, Alberta, for the purpose of conducting an annual sale of pure bred stock. About sixty leading stockmen were present. Secretary, John McKenty, Lacombe, Alta.

THE GOAT BREEDERS OF BRITISH COLUMBIA ORGANIZE

The British Columbia Goat Breeders' Association held its annual meeting in Vancouver in January. Goat breeding is an expanding industry in the province, and the membership shows an increase over the previous year of nearly one hundred. Breeders elsewhere in Canada are looking to British Columbia for their stock and the members are striving to maintain their herds at a high level of quality. A number of shows were held during 1920 at which a healthy rivalry was indicated. Increasing recognition of the value of goat's milk for the feeding of children, particularly in cases of malnutrition, is noted. The medical profession is recommending its use more and more, with gratifying results.

The officers elected for 1921 were:—President: W. H. Cottrell, Vancouver; Vice-President: C. H. Unwin, Victoria; Secretary, George Palmer, Department of Agriculture, Victoria.

THE LIBRARY

List of recent and more important additions to the Library of the Department of Agriculture, International Institute Branch, Ottawa.

An Introduction to Bacterial Diseases of Plants, by Erwin F. Smith, Philadelphia, W. B. Saunders Co., 1920.

Weeds of Farm Land, by Winnifred E. Brenchley, D.Sc., F.L.S., Fellow of University College, London, Botanist, Rothamsted Experimental Station. London, Longmans, Green & Co., 1920.

Physiology of Farm Animals, by T. B. Wood, M.A., F.R.S., and F. H. A. Marshall, Sc.D. Part I, General, by F. H. A. Marshall, Sc.D., Fellow of Christ's College, Cambridge, and Reader in agricultural physiology. Cambridge, University press, 1920.

Some Recent Researches in Plant Physiology, by W. R. G. Atkins, M.A., ScD. (Dubl.) F. I. C., Assistant to the University Professor of Botany, Trinity College, Dublin. London and New York, Whittaker, 1916.

A Course of Practical Chemistry for Agricultural Students, by L. F. Newman, M.A., F.I.C., Fellow of St. Catharine's College, Cambridge, and H. A. D. Neville, M.A., B.Sc., F.I.C. Professor of agricultural chemistry, University College, Reading. Cambridge, University press, 1920.

Botany with Agricultural Application, by John N. Martin, Ph. D., Professor of botany at the Iowa State College of Agricultural and Mechanic Arts, 2d edition revised. New York, John Wiley & Sons, inc. 1920.

Les Industries de L'Alimentation, by Paul Petit, Professeur a la Faculte des sciences de Nancy. Paris, Payot & Cie, 1919.

Chemical Fertilizers and Parasitocides, by S. Hoare Collins, M.Sc., F.I.C., Lecturer and adviser in agricultural chemistry. Armstrong College, New York, D. Van Nostrand Co., 1920.

The Elements of Marketing, by P. T. Cherington, formerly Professor of Marketing in the Graduate School of Business Administration, Harvard University. Toronto, Macmillan Co. of Canada, 1920.

The Encyclopedia of the Stable, by Vero Shaw, Editor of "The Horse World". New York, E. P. Dutton & Co., 1909.

The Laws of Hybridizing, discovered by Richard Diener, Kentfield, Calif., published by the author, c1920.

Biology for High Schools, by W. M. Smallwood, Syracuse University, Ida L. Reveley, Wells College, and Guy A. Bailey, Genesee State Normal School. Boston, Allyn & Bacon, 1920.

Food and the Public Health, by William G. Savage, B.Sc., M.D., London, D.P.H. County Medical Officer of Health, Somerset. Toronto, Cassell & Co., Ltd., 1919.

Travelling Publicity Campaigns, by Mary Swain Routzahn. New York, Russell Sage Foundation, c 1920.

Pasture Studies: Some Results, by T. J. Jenkin, D.Sc., Adviser in agricultural botany, University College of North Wales, Bangor, Jarvis & Foster, 1919.

Design and Construction in Wood, by William Noyes, Assistant Professor of Industrial Arts, Teachers' College, Columbia University. Peoria, Manual arts press, 1919.

The Mechanism of Mendelian Heredity, by T. H. Morgan, Professor of experimental zoology, Columbia University, A. H. Sturtevant, H. J. Muller, and C. B. Bridges, all of Columbia University. New York, Henry Holt & Co., c1915.

Les Abeilles et le Miel, par J. Gaget, Professeur d'agriculture, Paris, Librairie Hachette, c1920.

The Bee Keeper's Vade Mecum, by Henry Geary. London, Stanley Paul & Co., c1920.

The Price of Milk, by Clyde L. King, Ph. D. Wharton School of Commerce and Finance, University of Pennsylvania. Philadelphia, John C. Winston Co., c1920.

Household Physics, by Alfred M. Butler, A.M. Head of Science Department, High School of Practical Arts, Boston. Boston, Whitcomb & Barrows, 1919.

Le Lait, Physiologie, Analyse, Utilization, by A. Monvoisin, Chef des Travaux de Physique et de Chimie. Ecole veterinaire d'Alfort, 2d edition. Paris, Asselin & Houzeau, 1920.

Official and Tentative Methods of Analysis as compiled by the Committee on revision of methods of the Association of official agricultural chemists, revised to November 1, 1919. Washington, D.C., 1920.

Margarine, by William Clayton, M.Sc., (Liverpool), Member of the British Association Committee of "Colloid Chemistry and its general and industrial application."

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Milk and its Hygienic Relations, by Janet E. Lane-Claypon, M.D., D.Sc., (Lond.) Assistant Medical Inspector under the Local Government Board. London, Longmans, Green & Co., 1916.

Agricultural Bacteriology, Theoretical and Practical, by John Percival, M.A., F.L.S., Professor of agricultural botany, University College, Reading, 2d edition. London, Duckworth & Co., 1920.

Physical Basis of Heredity, by Thomas Hunt Morgan, Professor of Experimental Zoology, Columbia University. Philadelphia and Montreal, J. D. Lippincott Co., 1919.

Life and Work of Sir Jagadis Chunder Bose, M.A., D.Sc. LL.D., F.R.S., C.I.E., C.S.I., Director of the Bose Research Institute. Calcutta, by Patrick Geddes, Professor of Sociology and Civics, University of Bombay. New York, Longmans, Green & Co., 1920.

The Chemistry of Crop Production, by T. B. Wood, C.B.E., M.A., F.I.C., F.R.S., Professor of agriculture, University of Cambridge. London, University tutorial press, Ltd., 1920.

The Microbiology and Microanalysis of Foods, by Albert Schneider, M.D., Ph.D., Professor of Pharmacognosy, University of Nebraska. Philadelphia, P. Blakiston's Son & Co., c1920.

Nature Study and Agriculture, by Charles C. Schmidt, M.S., Professor of education in the University of North Dakota. Boston, D. C. Heath & Co., c1920.

Short Talks on Personal and Community Health, by Louis Lehrfeld, A.M., M.D., Agent for the prevention of disease, Dept. of Public Health, Philadelphia.

Gas-Engine Principles, by Roger B. Whitman, New York, D. Appleton & Co., 1920.

The Evolution of Sex in Plants, by John Merle Coulter, Head of the Department of Botany, University of Chicago. Chicago, University of Chicago press, 1916.

Farm and Garden Tractors, by A. Frederick Collins, Member of the Royal Aero Club of the United Kingdom. New York, F. A. Stokes Co. c1920. 279pp. illus. cloth, \$2.25.

Outlines of Dairy Bacteriology, by H. I. Russell, Dean of the College of Agriculture, University of Wisconsin, and E. G. Hastings, Professor of agricultural bacteriology, University of Wisconsin. 11th edition. Madison, published by the author, 1920.

Condensed Chemical Dictionary.—Compiled and edited by the Editorial staff of the Chemical Engineering Catalog. New York, Chemical Catalog Company, Inc. c1920.

The Pasteurization of Milk from the Practical Viewpoint, by Charles H. Kilbourne, late Chief of the Division of Pasteurizing Plants, New York City Dept. of Health. New York, John Wiley & Sons, inc., 1916.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

The Maple Sugar Industry in Canada, Pamphlet No. 8, Publications Branch.—This pamphlet, compiled by the Director of Publicity, Mr. J. B. Spencer, replaces "Bulletin No. 2B" published in 1913, which is revised and brought up to date to indicate the progress of the maple sugar and syrup industry in Canada. The pamphlet is well illustrated, and fully describes modern processes from the gathering of the sap to the marketing of the products. Statistics of production are given.

Report on the Agricultural Instruction Act, 1919-20.—This report reviews the various forms of work carried on during the year by the provinces, by means of the

grants made by the Dominion in aid of agricultural education and instruction.

Tick Paralysis in British Columbia.—Bulletin No. 28 of the Health of Animals Branch. Describe the Paralysis Tick and its effects. Coloured illustrations.

ONTARIO

Report of the Horticultural Societies of Ontario, 1919.—Issued by the Department of Agriculture, Toronto, Ont.

Dairymen's Association of the Province of Ontario, 1919.—Issued by the Ontario Department of Agriculture. This report deals with the work of the two associations, Eastern and Western, and also includes a

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report on the Dairy Branch of the Ontario Agricultural College and on the Eastern Dairy School, Kingston.

Report of Committee on Rural Credits, 1920. This report contains information on the subject of rural credits compiled by the committee appointed to investigate the problem, together with recommendations as to the establishment of rural credit societies under Ontario conditions.

SASKATCHEWAN

The Fifteenth Annual Report of the Department of Agriculture of the Province of Saskatchewan for the year ended April 30, 1920. This report includes that of the Deputy Minister of Agriculture, Secretary of Statistics, the Chief Game Guardian, Bureau of Labour, and of the Heads of several branches of the Department proper.

Report of the Director of Agricultural Extension, 1920.—The report deals with the activities of the agricultural societies, including shows and exhibitions, ploughing matches, crop and other competitions, live stock sales, seed fairs, and short courses, during the period covered.

BRITISH COLUMBIA

Clearing Bush Lands.—Bulletin No. 85 of the Department of Agriculture of British Columbia. Third edition, revised to meet changing conditions with respect to land clearing in British Columbia.

MISCELLANEOUS

Scientific Agriculture.—This magazine, which is the official organ of the Canadian Society of Technical Agriculturists, published its first number in January, 1921. The magazine is issued in the interest of Agricultural Science and Research, and has for its object the general advancement of Agriculture in Canada. As the publicity medium of the organization, it proposes to deal with the educational, scientific, and more advanced

phases of agricultural effort, and will not overlap the sphere occupied by the agricultural press. There is obviously a place in this country for a magazine representing the technical and scientific aspects of agriculture, and the members of the Society will no doubt co-operate in making the undertaking a success.

Scientific Agriculture is issued monthly by the Garden City Press, Ste Anne de Bellevue, P.Q. The editor is Mr. Fred. H. Grindley.

School Agriculture and Club Leader.—This is a new monthly periodical, issued by direction of the Minister of Education for Saskatchewan to supersede *The Rural Education Monthly* and *The League News*. It will constitute the official publicity medium for Elementary Agricultural Education, School Exhibitions and Boys' and Girls' Clubs, under the supervision of the Director of School Agriculture, Department of Education, Regina.

Live Stock and Animal Products Statistics, 1909-1919.—Dominion Bureau of Statistics, Ottawa. This statistical report on the live stock and allied industries of Canada is the first of a proposed series, designed to present a general review of production and trade during the period of the war, with sufficient pre-war data to afford a basis for comparison.

The Canadian Jersey Cattle Club Record, volume IV, 1919.—Issued by The Office of the Canadian National Live Stock Records, Ottawa.

Canadian Aberdeen-Angus Recorder.—The official publication of the Canadian Aberdeen Angus Association, Brandon, Manitoba.

The Canadian Swine Breeders' Record, Volume 31, 1920, compiled by the Canadian National Live Stock Records, Ottawa, comprises the pedigrees recorded during the year of the various breeds of swine, index to animals and to breeders and owners' membership list, etc.

THE AGRICULTURAL PRESS

INDEX TO ARTICLES BY OFFICIALS OF DOMINION AND PROVINCIAL DEPARTMENTS OF AGRICULTURE.

The Canadian Countryman, Toronto, Ont.

January 15. *How Dairymen can Successfully Meet Lower Prices.* H. H. Dean, Professor of Field Husbandry, O. A. C., Guelph, page 3.

January 22. *Short Versus Long Keep Steers.* G. W. Muir, Central Experimental Farm, Ottawa, page 4.

February 5. *Official Grading and Control of Dairy Produce for Export.* J. A. Ruddick, Dairy Commissioner, Ottawa, page 4.

February 12. *Official Grading and Control of Dairy Produce for Export* (concluded). J. A. Ruddick, Dairy Commissioner, Ottawa, page 6.

February 19. *Paying for Milk According to Butter-fat Content.* Prof. H. H. Dean, page 3.

January 29. *How to Lower the Cost of Milk Production.* E. S. Archibald, Director, Experimental Farms System, page 3.

The Canadian Farmer, Toronto, Ont.

January 29. *The Agglutination Test for Contagious Abortion in Cattle.* Prof. H. Jones, Department of Bacteriology, O. A. C., Guelph, page 4.

The Farmer's Advocate, Winnipeg, Man.

January 5. *Gaitre and Hairlessness in Sheep, Swine, Cattle and Horses.* G. S. Freeborn, Sheep and Goat Division, Dominion Department of Agriculture, page 9.

Some Biological Problems in Agriculture. Prof. V. W. Jackson, M.A., page 12.

Dairying the World Over. J. A. Ruddick, Dairy and Cold Storage Commissioner, Department of Agriculture, Ottawa, page 7.

February 10. *Co-operative Marketing of Live Stock from the Maritime Provinces.* W. R. Reek, Assistant Commissioner, Live Stock Branch, Ottawa, page 191.

Farm and Dairy, Toronto, Ont.

January 6. *Official Grading and Control of Dairy Produce.* J. A. Ruddick, Dominion Dairy Commissioner, page 1.

February 17. *The Live Stock Industry.* Geo. E. Day, Secretary, Canadian Shorthorn Breeders' Association.

January 20. *Lowering the Cost of Milk Production.* E. S. Archibald, Director Dominion Experimental Farms System, page 7.

The Agricultural Journal, Victoria, B. C.

February 7. *Vanished and Vanishing Birds.* P. A. Taverner, Ornithologist to the Geological Survey, page 346.

January 27. *Prevention of Calving Troubles.* Geo. W. Muir, Central Experimental Farm, Ottawa, page 7.

Native Industries—Such as Factory Dairy ing. J. B. Reynolds, President, O. A. C. Guelph, page 3.

February 3. *Future Prospects of the Dairy Industry.* H. H. Dean, O. A. C., page 5.

Farm and Home, Vancouver, B. C.

January 20. *Time has Arrived for Re-establishing the Swine Industry in Western Canada.* A. A. MacMillan, Chief, Sheep and Goat Division, Live Stock Branch, Ottawa, page 4.

February 3. *The Danger of the Codling Moth to the Fruit Industry.* Dean F. M. Clement, University of British Columbia, page 5.

Farmer's Magazine, Toronto, Ont.

January 1. *Where the Urban Crowds the Rural.* President J. B. Reynolds, O.A.C., Guelph, page 11.

February 17. *Economic Feeding of Dairy Cows.* E. S. Archibald, B.A., B.S.A., Director of Central Experimental Farm. Ottawa.

The Grain Growers' Guide, Winnipeg, Man.

January 5. *Co-operative Activities in Sask..* J. F. Booth, B.S.A., Co-operation and Markets Commissioner, page 9.

Journal of Agriculture and Horticulture, Quebec, Que.

February 1. *Are We Doing Our Best for Our Boys and Girls.* J. Harold McQuat, Demonstrator to Rural Schools, Macdonald College, Que., page 137.

Bush and Cane Fruits Suitable for Quebec. T. G. Bunting, B.S.A., Prof. of Horticulture, Macdonald College, Que., page 148.

Why not More Hogs? A. A. MacMillan. Chief, Sheep and Goat Division, Ottawa, page 143.

The Nor' West Farmer, Winnipeg, Man.

January 5. *Crop Rotations for Prairie Farms.* E. S. Hopkins, M.s., B.S.A., page 5.

The Saskatchewan Farmer, Moose Jaw, Sask.

January 3. *Canadian Live Stock Industry, Retrospect of Past Few Years and Outlook for the Future.* Hon. Dr. Tolmie, Dominion Minister of Agriculture, page 15.

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

GENERAL INFORMATION

- 4.—**Action of Ultra-Violet Rays on Vitamines.**—ZILVA, S. S., in *Biochemical Journal* Vol. XIII, No. 2, pp. 164-171. Cambridge, July, 1919.

The fat-soluble A. factor in butter fat is destroyed by an 8 hours' exposure to ultra-violet rays; at the same time the butter is bleached and becomes unfit for consumption. The author therefore asks whether the sterilization of milk by the ultra-violet rays can decrease its nutritive value.

The antineuritic and antiscorbutic vitamins are not destroyed by ultra-violet rays; in fact, the author has reported that the exposure of neutralized lemon juice for 8 hours to ultra-violet rays did not influence its antiscorbutic activity, and that a similar exposure of autolysed yeast juice did not impair its antineuritic power.

CROPS AND CULTIVATION

- 1082.—**Protection Against Hail.**—LABERGIERE, in *Revue de Viticulture*, Year XXVI, Vol. LI, No. 1308, pp. 53-57, Paris, July 24, 1919.

In this article, the author gives a summary of facts relating to the storms that have occurred during the last few years in different parts of the country, and the damage they have caused. He treats successively of the effect of hail-rods (*niagaras electriques*), and anti-hail cannons, bombs and rockets. He concludes from the results of the experiments carried out that there is no practical manner of controlling hail, and states that the great expense which has been incurred in the attempt to devise apparatus for this purpose, has produced no adequate results; hence, all further efforts in this direction are useless.

- 10.—**Effect of Weather Conditions on the Setting of Fruit in the Plum in Minnesota, U.S.A.**—DORSEY, M. J., in *Journal of Agricultural Research*, Vol. XVII, No. 3, pp. 103-126. Washington, June, 1919.

Results of a series of parallel meteorological and biological observations made with

the object of determining in what manner and to what extent, weather influences the setting of fruit in the plum.

The author made these observations at the Fruit Breeding Section of the Agricultural Experiment Station of the University of Minnesota, on different species of *Prunes*, during the period 1915-17. The most important weather conditions which affect the setting of fruit are certainly rain and low temperature, which act in a clearly negative manner and may cause a failure of the crop even when the trees have flowered abundantly.

However, to understand correctly how rainfall and temperature affect the setting of fruit, it is necessary to investigate this phenomenon briefly from an anatomic and physiological point of view.

The period during which the stigma of the plum remains receptive is, at most, one week; pollination must therefore be effected during this relatively short period to enable fertilization to take place. All conditions which delay pollination cannot therefore but have a negative influence on the formation of fruit. Further, besides the degree of receptivity of the stigma, there is another phenomenon which helps to still further limit the time during which fertilization is practicable; this is the detaching of a part of the pistil which takes place from 8 to 15 days after flowering. And, before the actual abscission of the style is effected, the layer or diaphragm of the modified and thickened cells of the absciss layer constitutes an obstacle to the lengthening of the pollen tube towards the ovary. All phenomena which hinder or slow down the growth of the pollen tube can therefore also influence the setting of fruit in a negative sense.

Now, continuous rain at the flowering season hinders pollination considerably and if prolonged may absolutely prevent it.

In an atmosphere saturated with humidity, the anthers, even if ripe cannot open, and if they are already open, they bend over at once when it commences to rain. Rainy weather during the period when the stigmas are receptive is itself sufficient to prevent the setting of fruit. Similar results have been

obtained artificially by continuous spraying of trees in flower with water.

The growth of the pollen-tube is in close relation with the temperature. The time required for penetration of the whole length of the style at a temperature of 55° to 60° F. is about 6 days for the variety "Surprise". The rate of growth of the pollen-tube decreases proportionally with the lowering of the temperature and, according to Goff, at 40° (4° F.C.) pollen ceases to germinate.

On the other hand low temperature does not appear to exercise any influence on the date of abscission of the style; however, it is easily understood that a cold spring at the time of flowering may hinder the setting of fruit by retarding the growth of the pollen-tube up to the moment when the layer of disintegrated cells on the plane of abscission prevents the pollen-tube from growing toward the ovary.

13.—On the Agricultural Properties of Soils; Research on the Reaction of Soils.

RABATE, E., note by M. Schribaux, in *Comptes rendus des Seances de l'Academie d'Agriculture de France*, Vol. V, No. 35, pp. 846-848 and 854-858, Paris, Oct. 29, 1919.

In order to judge the agricultural properties of soils and water and especially their chemical and physiological properties, among other tests, it is indispensable to know whether they have an alkaline or an acid reaction. To quote only a few established facts: Acid waters are bad for irrigation; in acid soils advantageous and immediate results may be expected with calcareous fertilizers (marl, lime, composts) and with alkaline manures (dung, liquid manure, slag, ashes). These almost always require phosphatic manures, and natural phosphates, finely ground, give good results. But bulletins of soil analyses issued by agricultural stations are usually silent on the subject of reaction of soils.

The author describes a new method which he has tested in various geological formations. He proposes to have recourse to logwood dye. This colouring matter has been studied by Chevreul, who extracted haematoxylin from it. The wood decoction turns yellow with dilute acids and red with concentrated acids; it is decolorized by sulphuretted hydrogen and turns violet with alkalis and alkaline salts; lime gives a blue precipitate.

The method of working is as follows:—20 cc. of distilled water or rainwater poured into a clear glass tube and 20 drops of the reagent are added; 5 gm. of fine earth, dried and sifted, are then mixed in the solution and left for 15-20 minutes.

Alkaline soils colour the water mauve or violet even when the alkalinity is very slight;

calcareous soils that lead to chlorosis give a more intense reaction. With acid soils the water becomes pale yellow, loses colour, or becomes leaden tinted. Neutral soils do not alter the original colour; they are very rare.

This is a simple and rapid method which, according to the author, is extremely sensitive.

1091.—The Lasting Benefits of Soil Blasting. —*Scientific American*, Vol. CXIX, No. 13, pp. 253, New York, September 28, 1918.

Back among the hills of Georgia an interesting experiment in sub-soil blasting has been in progress for the past four years. The soil in this district is of a rich upland grade, and the sub-soil is red and very hard. In 1914, two acres were measured off. One was left for a check acre, the other was sub-soiled with dynamite. Charges were exploded with blasting cap and fuse every 15 feet, 30 inches deep. This thoroughly shattered the hard, red clay, making cobweb fissures in all directions and thus permitting more water to enter than had before been possible. The roots also benefited by the breaking up of the subsoil, new avenues being opened up for them to go out in search of plant food.

Both acres were planted with cotton in 1914. Both received the same cultivation and care, though the subsoiled one got a little more fertilizer than the other. The difference in this respect was not nearly enough, however, to account for the discrepancy between the yield of 1,804 pounds of seed cotton for the blasted acre and 912 pounds for the unblasted plot.

Maize followed in 1915. This year both plots received identical treatment and fertilization. They were both kept well worked and clean. The yield of maize in the husk was 2,614 pounds for the blasted acre, 1,849 pounds for the other. Owing to the wet weather, it was impossible to weigh the fodder; there were, however, 225 bundles on the blasted acre against 115 bundles on the check acre.

In 1916, the plots were under cotton again, and the benefits of the blasting were more pronounced than ever. From the very start of the growing season, the cotton on the subsoiled acre outgrew the other, and by midsummer it was at least twice as high. It also fruited much better than that on the unblasted land, and when the yield was measured it was found to be exactly twice as productive: 2,000 pounds against 1,000.

In 1917, maize was once more planted on the two test acres. The blasted acre yielded 42½ bushels of maize and three full loads of fodder; the unblasted acre, 35 bushels and barely 2½ loads of fodder. The obvious conclusion was, therefore, that the blasting

had been a profitable investment. The increased yields soon took up the initial cost, leaving all subsequent crop increases as net profit. This is good farming as well as good business.

1115.—Intra-Organic Injections for the Purpose of Increasing the Yield of Plants: Experiments in Mexico and Cuba.—CALVINO, M., in *Revista de Agricultura, Comercio y Trabajo*, Year 2, Vol. II, No. 6, pp. 287-291. Havana, June, 1919.

Although the Russian botanists were the first to study the effect of injections upon plants, the credit of applying this treatment to a definite agricultural purpose belongs to Prof. Petit, of Mexico. When the writer was Director of the Central Agricultural Station of Mexico, he carried out, in 1912, a series of experiments with a view to determining the practical value of these injections. An old pear tree, which was covered with blossom every year, but never bore fruit, was subjected to the following treatment: at a little distance above the level of the ground, a hole extending as far as the fibro-vascular bundles was bored in the trunk. Into this hole was inserted a small glass tube communicating by means of rubber-tubing with a vessel (placed 1.5 m. above the ground) containing a nutrient solution composed of water 18 litres + sulphate of iron 19 gm. + nitrate of sodium 10 gm. The tree absorbed the solution in about 3 days. The following month, the leaves were larger and brighter in colour than those of the control trees (two old pear trees which, like the first one, flowered freely, but produced no fruit), numerous fruits set and developed well, whereas the control trees bore no pears.

In 1913, the writer made another experiment on a sterile pear tree. He used the following solution: water 20 litres + superphosphate 5 gm. + sulphate of potassium 5 gm. + nitrate of sodium 5 gm. + sulphate of iron 5 gm. The pear tree absorbed more than 50 litres of this solution just before the moment of flowering. It was well-covered with blossom and bore fruit. A lilac grafted on a privet was treated in the same manner, and produced a larger number of finer flowers.

The writer continued his work at the Agricultural Station of Santiago de la Vegas, where he experimented upon caryas.

This operation method opens up new fields of work: the injection of virus into plants suffering from bacterial diseases; the injection of vegetable substances (camphor, etc.) to induce vigorous growth: the injection of a solution of the product for which the plant is cultivated (for instance sugar in the case of the sugar-cane), in order to induce the "habit of the substance", and thus obtain more productive varieties, etc.

Injury to Seed Wheat Resulting from Drying After Disinfection with Formaldehyde.—

HURD, ANNIE M., in *Journal of Agricultural Research*, Vol. XX, No. 3, pp. 209-224. Washington, D.C., November 1, 1920.

No seed injury was produced by treating wheat with either a 0.1 per cent (1 to 40) or a 0.2 per cent (1 to 20) solution of formaldehyde if the seed was germinated immediately after treatment.

If treated seed is held for several days or more before sowing, it is severely injured if allowed to dry without thorough aeration during the storage period. If, however, the seed remains damp, it suffers no injury from a 0.1 per cent solution and can be so kept indefinitely or until attacked by moulds.

Post-treatment injury is usually cumulative, increasing in degree the longer the seed is stored.

This seed injury upon drying apparently is due to a deposit of paraformaldehyde on the seed, which forms as the formaldehyde solution evaporates. The solid paraformaldehyde, being volatile, is constantly breaking down into formaldehyde gas. This gas, being thus concentrated and held so close to the seed, penetrates it slowly, probably going into solution in the testa.

The degree of post-treatment injury depends primarily on atmospheric humidity during the storage period. In atmospheres damper than 70 per cent humidity the treated seed can be kept indefinitely without ill effects. In those of 70 per cent and less there is decided injury, which is most severe in the intermediate humidities, gradually decreasing in the lower ones until seed stored in an absolutely dry chamber is almost uninjured.

No paraformaldehyde formed upon the evaporation of formaldehyde solutions placed in these damper chambers in which no seed injury occurred, but it did form in all solutions evaporated in desiccators of 60 per cent humidity and less, the quantities by weight increasing as the atmosphere became drier. Therefore, seed injury in the desiccators was not determined by the quantity of paraformaldehyde formed on the seeds in each.

Untreated wheat, when placed in desiccators of varying atmospheric humidities alongside of evaporating, undiluted 36.2 per cent formaldehyde solutions, was least injured in the absolutely dry chamber and was entirely killed by the formaldehyde vapour in all the chambers damper than 30 per cent humidity.

In view of the facts that treated seed is less injured in very dry atmospheres than in intermediate ones and that untreated seed is least injured by formaldehyde fumes in the dry atmosphere of desiccators, it is considered probable that formaldehyde does not enter seeds as a gas or in the solid polymeric

form but in solution in the seed coats. For the maximum seed injury to occur as a result of drying after formaldehyde treatment, therefore, there must be an optimum atmospheric humidity to permit, first, the formation of paraformaldehyde, and second, the solution of formaldehyde gas in the seed.

This post-treatment injury is minimized by spreading the seed as it dries so that maximum aeration occurs, thus hastening the evaporation of paraformaldehyde and the escape of the gas from around the seed.

Barley is less susceptible to post-treatment injury upon drying after soaking in a 0.1 per cent solution, probably because of the protection afforded by the glumes; but when stronger solutions are used the injury is very severe.

Seed dried for an hour by being thinly spread on towels in the laboratory and then sealed in bottles is uninjured after weeks of storage; but seed dried longer, although uninjured by the rapid drying, is injured upon being sealed, presumably because of the concentration of gas in the bottle as a result of decomposition of the paraformaldehyde on the seed. Treated seed dried from 5 to 24 hours was more injured upon being sealed than when dried for a longer time.

The sorghums, Brown durra, Honey sorgo, and Sudan grass, are uninjured upon being stored dry after treatment, even when a 0.2 per cent solution is used.

Post-treatment injury from dry storage is entirely prevented by washing the seed with water immediately after treatment.

1117.—Fertile Wheat-Rye Hybrids Produced by Crossing Experiments in the United States.—LOVE, H. H., and CRAIG, W. T., in *The Journal of Heredity*, Vol. X, No. 5, pp. 195-207, Washington, May, 1919.

The writers have made a number of crosses between wheat and rye. Most of the resulting F_1 hybrids proved sterile, though in many of their morphological characters they were intermediate between their parents. Two fertile hybrids were, however, produced, and the results obtained from one of these crosses is described in this article. The variety of wheat known as Dawsons' Golden Chaff was crossed with common rye, and from this cross one plant was obtained. This F_1 plant gave every indication of being a wheat-rye hybrid. It had a few awns developed, particularly at the tip of the head. The glumes were brown, and intermediate in character between those of wheat and rye. They were keeled (rye character) and ciliate, and there was only a slight pubescence of the peduncle.

This hybrid plant was not completely fertile, but one seed was obtained from it, and the head of this F_2 individual was much like that of the female parent in F_1 but more awns were developed. This hybrid showed

its rye parentage in many ways: not only had it a larger number of awns, as has already been said, but the glumes were more sharply keeled and more ciliate. The peduncle was not pubescent at all. From this F_2 individual only one well-developed ripe viable seed was obtained. The F_2 plant resulting from this single seed showed fewer of the rye characters which had been conspicuous in the two previous generations, in fact, it did not show its hybrid nature to any great extent, as far as the head characters were concerned.

A number of seeds were sown from this plant, and an F_3 generation was grown. The hybrids thus obtained were very variable as regards the awns and the colour of the chaff and kernel. The colour seemed to follow a simple mendelian ratio of 3:1 similar to that occurring when two varieties of wheat (one pigmented and the other unpigmented) are crossed.

The ears were all more like wheat than rye, though in some respects they indicated their hybrid origin, the awns being considerably developed, and the glumes ciliated. Many of these plants resembled rye in the colour of their stems, and the general appearance of their vegetative organs. There is considerable variation as to the degree of sterility in these hybrids, some are entirely fertile whereas others (for instance Nos. 43 and 47) are nearly sterile. The shape of the kernels also varies considerably.

Some of the families of the F_2 generation have been carried further and they continue to produce descendants that are more wheat-like as far as their ears are concerned, while the rest of the plant shows some resemblance to rye.

Some of these hybrids are now being tested under field conditions to determine whether they have inherited any of the winter hardiness of rye. If a plant could be obtained which combined the good qualities of wheat with the winter hardiness of rye, it would be possible to sow later than is now done, and to grow crops in areas where the winters are too severe for wheat.

30.—Transmission of Dwarf Character in Marquis Wheat, in Canada.—CUTLER, G. H., in *Journal of the American Society of Agronomy*, Vol. II, No. 2, pp. 76-78. Washington, Feb., 1919.

When he was professor of the University of Saskatchewan the author noticed the occurrence of a dwarf plant (9 inches high) in a field of Marquis wheat. Desiring to study this phenomenon from a genetic standpoint, he selected 200 typically normal heads and sowed separately 20 seeds of each head. Even before harvest it was easy to notice the characteristic variations in some rows, especially in row No. 186, which included: plants from 9 to 40 inches high; normal tall

plants; dwarf plants; intermediate plants. As a whole these plants had the characters of descendants in F_2 , confirmed by the following facts: (1) in subsequent generations of dwarf plants the proportion of dwarfs reached 100 per cent; (2) the tall plants produced exclusively tall normal plants; (3) the intermediate plants produced 25 per cent dwarfs (Mendelian ratio=1 dwarf: 3 normal). Both for wheat and oats the dwarf character would, therefore, depend on a single determinant, recessive in relation with the determinant which dominates the normal growth of the plants. The occurrence of dwarf forms of wheat had previously been observed and studied by Richardson and by Farmer in Australia.

Marquis Wheat in the United States.—

U.S. Dept. of Agriculture, *Weekly News Letter*. Washington, D.C., December 29, 1920.

That Marquis wheat¹ is the leading variety of common wheat for growing in the Northern Great Plains is the conclusion reached by specialists of the United States Department of Agriculture as a result of varietal experiments with spring wheat conducted at 11 field stations in the northern half of the Great Plains area chiefly in co-operation with the State experiment stations. Details of the experiments, including discussions on the principal varieties, how and when they come to the region, and how to distinguish them, are contained in Department Bulletin 878, *Varietal Experiments with Spring Wheat on the Northern Great Plains*, recently issued by the department.

Marquis wheat was first introduced into the United States from Canada in 1913, but is now more widely grown than any other variety. It is short-strawed and early maturing, which characteristics sometimes enable it to escape rust and drought.

A demand for information on comparative yields of varieties and their resistance to disease was developed in the Great Plains area by severe losses which have occurred recently, due principally to drought and rust. Although crop yields have sometimes been low, land values have continued to increase in about the same proportion as in other sections. This has increased the cost of production and, with a return to lower prices for wheat, it is essential that the poorly adapted varieties be eliminated.

Hundreds of foreign and domestic varieties of wheat have been obtained by the department and tested. In preliminary nursery experiments many of them did not show themselves fitted for culture in the semiarid sections. These varieties were rejected and

only the more promising ones were selected to be grown in plat experiments.

In Bulletin 878 the annual yields of the spring wheat varieties grown during the seven years, from 1913 to 1919, are shown for each station. A summary of the yields shows that, in general, the Marquis variety is the highest yielding common spring wheat. It has been included in all of the experiments each year. The better varieties of Durum wheat have outyielded Marquis at all stations but one. The Kubanka Durum wheat outyielded Marquis at eight of the ten stations where it was grown.

Data on rust infection were obtained at seven stations. Marquis wheat shows an average rust infection of 17.7 per cent in twenty observations. Most of the important commercial varieties of common spring wheat showed a higher percentage of rust infection than Marquis, while all varieties of Durum wheat showed less rust.

The leading varieties of spring wheat grown at the eleven stations were milled in an experimental mill and the flour baked into bread in order to determine their relative values for flour and bread-making. It was found that growing conditions and disease had much influence on the percentage of flour obtained, Marquis wheat yielding as low as 56.4 per cent of flour from sections where it had been affected by rust, while under favourable conditions it produced as high as 75.8 per cent of flour. The average yield of flour from 37 samples of this variety was 70.2 per cent. Several varieties of common wheat produced distinctly lower percentages of flour than Marquis. Preston (Velvet Chaff) and Haynes Bluestem produced about the same percentage as Marquis. Prelude was the only variety of common spring wheat which had a distinctly higher flour yield than Marquis, the difference being 2.6 per cent. All varieties of Durum wheat, however, yielded a higher percentage than Marquis, except D-5, a red-kerneled Durum wheat which is low in milling value. Each wheat sample was analyzed for nitrogen and the crude protein content determined. Marquis wheat had an average protein content of 15.3 per cent, and other common spring wheats differed only slightly from it.

In concluding the experiments, flour made from each variety of wheat was baked in order to determine the expansion or strength of the dough, the quality of the gluten, and the resulting texture and lightness of the bread. The average loaf volume obtained from 37 samples of Marquis wheat was 2,342 cubic centimetres from 340 grams of flour. This was a greater volume than was obtained from any other variety of wheat except one. All varieties of Durum wheat have a smaller loaf volume than Marquis.

¹ Dr. Charles Saunders, Dominion Cerealists, is the originator of Marquis Wheat.

Experiments with Kherson and Sixty-Day Oats.—WARBURTON, C. W., and STANTON, T. R., in *United States Department of Agriculture, Bulletin* 823, pp. 72. Washington, D. C., 1920.

This bulletin is a compilation of results from oat variety experiments, including Kherson and Sixty-Day, conducted by this Department and the State experiment stations, independently and in co-operation for periods ranging from 4 to 14 years and covering a wide scope of soils and climatic conditions. The histories and descriptions of the two varieties are included, together with brief statements on yields of straw, weights per bushel, percentage of hull, and improvement work. The yield data from the different stations are tabulated in both detailed and summarized form, and with the aid of numerous diagrams are fully discussed. In conclusion, the authors designate the varieties and types that have proved best for each section of the country. A list of 51 titles, comprising literature cited, is appended.

A general consideration of the results noted led to the conclusion that the early varieties, Kherson and Sixty-Day, yielded well in most of the spring-oat sections of the United States. The summary of average results indicates that at more than 50 per cent of the stations under a wide range of climatic conditions, early varieties have outyielded midseason and late varieties. Kherson and Sixty-Day are said to have given the best results in the warmer humid, subhumid, and semiarid sections. Late varieties were superior in yield to those of the midseason group at only a few stations.

38.—Origin, Production and Value of the Seeds of Conifers.—PICCIOLI, L. (Professor of sylviculture, apiculture, and technology, at the Royal Forestry Institute of Florence), in Extract from *Annali del R. Istituto superiore forestale nazionale*, Vol. IV-V, pp. 185, 190. Bibliography, Florence, 1920.

Monograph on the seeds of conifers containing the following chapters: Importance of heredity of mutations.—Effects of origin.—Prohibition of exportation.—Private, commercial, and State production.—Importance of the choice of trees for the quality of seeds.—Periodicity of abundant seedings, and causes which determine them.—Collection of fruit.—Extraction of seeds from their cones.—Sorting.—Volume, weight and production, per unit of fruits and seeds.—Fertility, lasting power, and preservation of seeds.—Frauds, and the utility of a control station.—Morphological characters for recognizing seeds.

This last chapter, which contains numerous data, may be usefully referred to in the work of control of seeds.

The publication ends with a long bibliography.

41.—The Cultivation of Cotton in Australia.—*The Board of Trade Journal*, Vol. CIII, 1914, p. 485. London, Oct. 6, 1919.

48.—Cultivation of Flax for the Manufacture of Linseed Oil in the United Kingdom.—VARGAS EYRE and MORRELL, R. S., in *The Journal of the Board of Agriculture*, Vol. XXVI, No. 4, pp. 420-428. London, July, 1919.

Relation Between the Annual Precipitation and the Number of Head of Stock Grazed per Square Mile.—SMITH, J. W., in *United States Monthly Weather Review*, Vol. 48, No. 6, pp. 311-317. Washington, D. C., 1920.

A review of the available data indicates that wherever grazing is carried on throughout the year it is possible to establish a close ratio between annual rainfall and the number of head of stock that can be grazed per square mile. In New South Wales, for example, where the rainfall is between 20 and 30 inches, 250 sheep are grazed to the square mile; where it is between 10 and 20 inches, 100 sheep; and where under 10 inches, only 40 sheep to the square mile.

In the Great Plains States the relation between the annual precipitation and the number of head of stock that can be grazed per square mile can be fairly well established, the possible number decreasing with fair uniformity from east to west with the decreasing annual rainfall. The number grazed in Oklahoma and Texas is close to 50 per square mile where the rainfall is between 25 and 35 inches, and about 40 where the rainfall is from 15 to 25 inches.

In the Great Plains States north of Oklahoma, where feeding is necessary during the winter time and where the rate of evaporation is less in the summer months, the grazing rate averages close to 20 where the rainfall is between 10 and 15 inches, nearly 40 where it is from 15 to 20 inches, and nearly 80 where it is 20 to 25 inches. The ratio rises at a faster rate with heavier rainfall.

In all the Rocky Mountain regions it becomes more difficult to establish a ratio between the annual precipitation and rate of grazing because of seasonal distribution of precipitation, temperature variations, the topography, soil, evaporation, snow cover, nature of the vegetation, and differences in the length of the grazing period. In the central and upper Rockies the grazing rate is slightly greater with small rainfall—amounts than farther east, because of the

shorter grazing period, but less than in the Great Plains with heavier precipitation, because of the relatively less grazing areas in the higher mountains, where the greatest precipitation occurs.

65.—Effect of Grazing upon Forest Reproduction.—I. SPARHAWK, W.K.N. Effect of grazing upon Western Yellow Pine Reproduction in Central Idaho, in *United States Department of Agriculture Bulletin* 738, *Contribution from the Forest Service*, pp. 31. Washington, D.C., 1918.—II. SAMPSON, A. W. Effect of Grazing upon Aspen Reproduction. *Ibid.*, No. 741, pp. 29, 1919.

The regulation and control of grazing is of far-reaching importance in the organization of absolute forest land for the continuous production of crops of timber. Too often in the past the United States has sacrificed reproduction in order to placate the cattle and sheep men, sacrificing thus reproduction at the most opportune time for obtaining it, and now it can only be secured by planting, often at prohibitive costs.

Throughout most of the western United States grazing on absolute forest land is of vast economic importance, and the forester accepts the general principles that grazing must be carried on as a part of forestry management.

He does not object so much to grazing as he does to unregulated grazing. In many parts of the western United States the present economic importance of grazing so overshadows the importance of the forest for the production of timber that there is grave danger in overgrazing much of the absolute forest land, which will lead to a gradual destruction of the timber now standing and more or less complete elimination of reproduction following fires and lumbering.

One of the most important problems dealing with large areas of the absolute forest land is how intensively can it be grazed without serious injury to it as a forest. The many researches conducted by the United States Forest Service and by other agencies in recent years have thrown much light on grazing problems in relation to natural reproduction.

I.—A recent study was made by the United States Forest Service of the effect of sheep grazing on a number of sample plots on three grazing allotments between 1912 and 1914 in the National Forest of Central Idaho. Sheep injure forest reproduction by browsing and by trampling. Slight browsing of the needles, of side branches, of the leader, or of the bark does practically no damage to the tree, though when repeated it may result in stunted growth or the death of the tree. Severe browsing, as occurs around bed grounds, often

kills the seedlings. Trampling usually is not serious. Damage to seedlings more than a year old is negligible; while as high as 100 per cent—an average of about 20 per cent for all plots—were killed when less than one year old. Western yellow pine (*Pinus ponderosa*) is injured the most by browsing, lodgepole pine (*P. contorta*) less so, and Douglas fir (*Pseudotsuga taxifolia*) least. White fir (*Abies concolor*) is practically never browsed. Of 1,782 seedlings killed, 73 per cent were less than a year old, and but five per cent were over six inches in height.

Injuries which did not result in death were greater late in the season than during the earlier period, due to drying of the forage as the season advanced. Those killed by grazing were greater earlier in the season than later, as the stem breaks more readily when succulent than after lignification has set in. Injury and death increased fairly constantly with increased intensity of grazing, though after a seedling's third year less than one per cent per year of the trees is killed by grazing of moderate intensity. More than three times as many seedlings are killed by other causes than sheep. Drought, winter-killing, rodents and birds, and fungous diseases, were the chief causes of death, while frost is responsible for minor injuries. The benefits of sheep grazing to the forest are through the reduction of fire by the destruction of the inflammable material and the aid to natural forest reproduction, which is often overestimated.

II.—Another study of the United States Forest Service deals entirely with the effect of grazing upon aspen reproduction. This study was conducted in the Monti National Forest, in Central Utah, and clearly shows that great damage to the natural regeneration of this species results from both sheep and cattle grazing, although the regeneration usually appears in dense stands and is almost entirely from root suckers. There is little or no aspen reproduction until the stands are severely opened up by lumbering or fire. Fully stocked reproduction is best after clear-cutting. The author's studies appear to show that even where sheep in moderate numbers are permitted to graze on such clearcut areas the aspen reproduction is often destroyed, almost, to the last sprout. The damage done by sheep is much greater than by cattle, and the damage by both depends upon the duration and intensity of the grazing.

The experiments extended over a period of five years, and sample plots were established on clear-cut areas, which were studied each year and records made of the reproduction. Some of the plots were lightly grazed, others moderately grazed, and still others heavily grazed. The amount of damage on all plots varied somewhat with the season. The mortality of one-year-old

sprouts, even under light grazing, is so high it is reasonably sure to have a determining effect on the stand of timber. If the sprouts that appear the first year after clear-cutting are destroyed by grazing, the sprouts, the succeeding year, are much less vigorous. Those produced the third season and later are distinctly lacking in vigour and are of little value for regeneration. Aspen sprouts grow rapidly, and at the end of three years they attain a height which exempts them from destructive grazing by sheep, and after four or five years are damaged little by cattle. The problem, therefore, seems to be the protection of reproduction for a period of three or five years after clear-cutting, or at least to protect it adequately to assure reproduction in fully stocked stands. Although the author believes that very light grazing by sheep may do little harm, he does not believe it practical to attempt sheep grazing for a period of three years after clear-cutting. He is of the opinion, however, that the moderate grazing of cattle will still permit a sufficient number of sprouts to survive to form a fully stocked stand. It appears to be necessary in order to obtain an aspen reproduction either to exclude stock altogether for a period of three years, or in the sheep country to shift from sheep to cattle for a three-period when sheep can again be safely grazed. Where the aspen is not in a cattle country the only necessity in order to obtain reproduction is to control the grazing and properly distribute the stock by means of drift and division fences.

The bulletins under review are additional evidence of the great injury to forest reproduction on absolute forest land by uncontrolled and unregulated grazing. The accumulated evidence of the past decade should force every thoughtful man to the realization that grazing is a serious menace to the natural reproduction of forests. The first duty of the forester is reproduction. Upon him falls the responsibility for successful crops of timber on absolute forest land under his control. It is his duty, therefore, and not of the stockman, to determine when and where stock should be grazed and when they should be excluded from given stands. It should be his province to decide the grazing possible within the limits of good forestry. The pressure for grazing areas in the western United States must not force grazing beyond the limits of the forest, thus causing its detriment and possible destruction.

LIVE STOCK AND BREEDING

- 67.—**Poisoning of Calves by Iris, Observed at Abbotsford, British Columbia, Canada.**
—BRUCE, E. A., in *Journal of the American Veterinary Medical Association*, Vol. LVI, New Series, Vol. 9, No. 2, pp. 72, 74. Baton Rouge, Oct., 1919.

Linnaeus had previously observed that Irises are poisonous to cattle but cases of poisoning by these plants are rare. Some cases of human deaths caused by eating the rhizomes of *Iris versicolor* in mistake for those of *Acorus Calamus* and several other species considered poisonous because they contain bitter resins and iridine, a purgative glucoside, have been noted. The author has noted three cases of poisoning of calves of three, four and four and a quarter months respectively, which being shut up in an enclosure, ate the rhizomes of a species of *Iris* which chanced to lie on the ground; two of them died before the second day and the third succumbed on the fourth day. The principal symptoms were: profuse salivation; inflammation and hardening of the ganglions of the head and neck; appearance of ulcers on the lips and muzzle; acute pain in the belly; faeces tinged with blood shortly before death. Post mortem examination showed—irritation of the third and fourth stomach; black spots on the intestines; kidneys, liver and spleen very dark in colour.

- 1168.—**Note on the Bacillus of Epizootic Abortion in Mares, Experiments made in Belgium.**—BRUYNOGHE, R., in *Comptes Rendus des Seances de la Societe de Biologie* (Meeting of the Belgian Biological Society), Vol. LXXXII, No. 23, pp. 954-955. Paris, July 19, 1919.

The study of cultures obtained by inoculating gelatine with the foetal products expelled by female donkeys suffering from epizootic abortion enabled the writer to establish the fact that all the different lines of bacteria observed had the same characters and belonged to a single variety, namely to a variety of the paratyphic bacillus B. On consulting the literature on the subject, the author found that Lignieres, De Jouy, and Van Heelsberger had described a similar bacillus as the cause of epizootic abortion in mares. In order to decide the connection existing between the micro-organism isolated from the donkey and that obtained from the mare, the writer subjected the two bacilli in question to the agglutination test. He prepared the agglutinin by injecting a rabbit with dead bacteria isolated in the Congo. These experiments enabled him to establish the identity of the two lines of bacilli. The micro-organisms producing contagious abortion, in mares, which had been isolated on the spot, were agglutinated to the same extent as the bacilli used in the preparation of the serum. This proves the identity of the pathogenetic agent affecting asses and mares. The bacillus occasioning contagious abortion in donkeys had not been isolated before.

68.—**Treatment of Horse Mange by Chloropicrin Fumes.** (1).—BERTRANS and DASSONVILLE, in *Comptes rendus de l'Académie des Sciences*, Vol. 169, No. 10, pp. 486-489. Paris, Sept., 1919.

The energetic insecticidal action of chloropicrin having been already reported by the authors, they wished to try it in the treatment of horse mange. The horses were shut up in closed boxes, from which only their heads emerged through an opening, a canvas collar holding the head of the animal. In the boxes 20 gm. of chloropicrin per cubic m. were projected, by means of a syringe, furnished with a vaporizing nozzle, avoiding direct projection of the liquid (very irritating) on to the animals. The animals remain in the box for half-an-hour. The head of the horse is coated with an ointment composed of 2.5 gm. of chloropicrin to 100 gm. of vaseline. The vapour bath is repeated a second time at the end of two or three weeks. The results were entirely satisfactory.

Compared with the treatment of mange by sulphur dioxide fumes treatment by chloropicrin fumes has the advantage of being: more rapid (30 minutes instead of two hours); easier (there is no sensible increase in the atmospheric pressure inside the boxes, which does away with the necessity for absolute airtightness; besides the new method has no destructive effect on the material of the collars, requires no special vaporizer, etc.); is surer; and less dangerous to the animals.

70.—**Determination of the Activity of Malleins.**—FAVA, E., in *Il Nuovo Ercolani*, Year XXIV, No. 16, pp. 193-198; No. 17 pp. 209-218. Turin, August 31, and September 15, 1919.

The author insists on the expediency of extending State control to specific products, which might be of use in the diagnosis of infectious diseases. The toxic power of mallein can only be estimated by experimenting with this substance on animals suffering from glanders; the author proposed to determine if it was possible to obtain sure results by employing for the purpose guinea-pigs attacked by glanders. He used malleins prepared in seven different institutes: Italian, French and Swiss. He diluted them with physiological salt solution containing 0.85 per cent of sodium chloride in decreasing proportions, from 1:3 to 1:200; a quantity of the dilutions thus prepared was mixed with an equal volume of fresh superimmunized serum in a first series of tests; with one-half of the volume of serum in a second series; with two volumes of serum in a third series. The mixtures thus prepared, rendered homogeneous by shaking, were heated to 37°C., and read after $\frac{1}{2}$, 1, 2, and 4 hours, then placed at a laboratory temperature,

and read at the 20th hour. A series of tables gives the results of these experiments of precipito-reaction.

The malleins were tested in parallel on guinea-pigs given glanders by means of a bacillary emulsion, obtained from 24-hour cultures in glycerined agar, from a stock taken from the ass.

Some guinea-pigs were experimented on with malleins, 36 to 48 hours after the appearance of specific symptoms, others at an advanced stage of experimental contamination. The different malleins were given by an intracerebral injection, in doses of 0.05, 0.10, and 0.15 cc. diluted in an equal volume of 0.85 per cent physiological solution, and by an intravenous injection in a dose of 0.50 cc., diluted in a triple volume of physiological solution; two tables give the results so obtained.

The author remarks that the intracerebral injection does not allow of the exact estimation of the toxicity of malleins in guinea-pigs suffering from glanders, because the peptone contains amino bases (especially tyramin), which may cause in intracerebral inoculations a symptom resembling an anaphylactic shock.

Conclusions.—(1) The control of malleins, on subjects suffering from glanders (guinea-pigs), requires much time, and consists of a complex, delicate, dangerous and costly method. Moreover, this method does not always give constant results, because of the intervention of the personal factor, which is not to be neglected, even if animals of the same age, of almost the same weight, infected by the same virus, and with the same quantity of it, are operated on.

(2) In the preparation of serum against glanders, Bertetti and Finzi used precipitogenous substances from *Bacillus malei*, which give rise to super-rich serums of specific precipitins.

Functional groups (haptophorous and precipitophorous group) of precipitable substances (malleins), which, in the case specified, are the above-mentioned immunizing precipitogenous substances, find their corresponding specific in the precipitins of super-immunized serum against glanders.

(3) The precipito-reaction, obtained with super-immunized serums against glanders, is absolutely useful and practical because of its easy use, its simplicity, and its certainty in the estimation of the toxicity and of the activity of the malleins put on the market.

(4) The greater the degree of dilution, at which it contains sufficient quantity of precipitable substance, able to react with the precipitins of super-immunized serum against glanders, the more active is the mallein.

(1) See also *Agricultural Gazette*, November, 1920, page 920.

79.—The Nutritive Value of Coconut Globulin and Coconut Cake.—JOHNS, C. O., FINKS, A. J., and PAUL, M. S., in *The Journal of Biological Chemistry*, Vol. XXXVII, No. 4, pp. 497-502. Baltimore, April, 1919.

81.—Colour Inheritance in Mammals.—WRIGHT, S., in *The Journal of Heredity*, Vol. VIII, No. 5, pp. 224-235; No. 8, pp. 373-378; No. 9, pp. 426-430; No. 10, pp. 473-475 and 476-480; No. 11, pp. 521-527; No. 12, pp. 561-564; Washington, 1917; Vol. IX, No. 1, pp. 33-38; No. 2, pp. 87-90; No. 3, pp. 139-144; No. 5, pp. 227-240. Washington, 1918.

77.—Vitamines in Green Fodder.—OSBORNE, T. B. and MENDEL, L. B., with the co-operation of FERRY, E. L., and WAKEMAN, A. J., in *The Journal of Biological Chemistry*, Vol. XXXVII, No. 1, pp. 187-200. Baltimore, January, 1919.

The authors have studied the presence in certain green plants of fat-soluble and water-soluble vitamins by means of feeding tests on rats. In order to test for each of these vitamins, the product under study was fed in a ration rich in the other kind of vitamin. The following vegetable foods were tested. leaves and stalks of spinach; whole inside leaves of cabbage; whole young plants of alfalfa, clover and timothy grass; after drying in the air at 50-60°, then finely ground.

The results obtained indicate that ten per cent of spinach furnished a little less than the required amount of water-soluble vitamin, while the rats obtained abundance (for normal development) of fat-soluble vitamin; 145 per cent of cabbage leaf appears to be equivalent to about ten per cent of spinach in respect of water-soluble vitamin. Preliminary experiments with the other plants indicate that the content in water-soluble vitamin of clover and timothy grass is similar to that of cabbage, while alfalfa is a little richer. The content of fat-soluble vitamin appears to be very high.

According to the few data at present available, green vegetables supply an important addition to human diet, because the staple foods (cereals, potatoes, sugar, meat, fats, etc.) furnish too limited a quantity of either of these vitamins to satisfy wholly the requirements of an adequate diet.

80.—Importance of Salt in Food Rations of Cattle.—JOFFE, J., in *Journal of Dairy Science*, Vol. II, No. 3, pp. 159-169, bibliography of 8 titles. Baltimore, May, 1919.

The author proposed to review the literature on this subject, to bring to light the opinions put forward recently on the matter

and if possible to draw practical conclusions from them. These conclusions may be summarized as follows: Want of salt in the rations causes pathological conditions and gives rise to a loss of live weight and of vitality, and consequently, a decrease in yield. The experimental data worked out by the author indicate that the necessary amount of salt, according to the rations, should vary between 36.6 gm. and 40.7 gm. per day for each milch cow in the cowhouse. Some foods, such as soya beans and Kaffir corn (a variety of sorghum) require a larger amount of salt. At the Agricultural Experiment Station of Kansas only salt obtained by evaporation is used, rock salt being too coarse and irritating.

82.—French Horses in America, Especially in the United States.—GRAU, ALFRED, in *Journal d'Agriculture pratique*, Year LXXXIII, No. 40, pp. 808-812. Paris, Nov. 6, 1919.

It seems most probable, that, among the French breeds of horses, the draught, and particularly heavy draught, breeds will come to the front, owing both to their less delicate constitution, and the greater success in their production, and of their more ready and advantageous sale.

French breeds of draught horses have long been universally appreciated; in America, and in the United States in particular, they are the most appreciated. This is a very interesting fact for French export.

Americans prefer quiet and powerful animals, as large and heavy as possible.

Whether from the drier climate, or for any other reason, these breeds, once they have been exported to North America, have a tendency to fine down, and to decrease in weight and size at the end of several generations; for this reason, it is necessary to renew the blood frequently for good sires.

Among the draught breeds in France, some, such as the Nord and Ardennes draught horse, have suffered much from the war, and it will take time and much trouble to restore them, but these will not be lacking.

Compared with these breeds, the others such as the Boulonnais, Percheron, Nivernais breeds, the mule producing breed of Poitou, the Breton draught horse have not suffered.

86.—Alfalfa as Sole Food of Dairy Cattle in the United States.—WOLL, F. W., in *Journal of Dairy Science*, Vol. I, No. 6, pp. 447-461. Baltimore, March, 1918.

The two most important changes in American agriculture during the past 25 years are the introduction of the silo in cattle farming and the introduction or the extension of alfalfa cultivation. The silo has spread

from the east westwards and alfalfa from the west eastwards. At the present time alfalfa occupies over 30 per cent of the irrigated area of the United States and seven per cent of the entire area under hay and fodder crops. The proper utilization of a crop of this importance becomes therefore a most important economic problem for the individual farmer and for the community. Furthermore, the fact that a very large number of farmers in the western States practice the method of feeding cattle exclusively with alfalfa has raised the question whether this practice is really the most economical. The author's research, carried out during more than three years at the California Agricultural Experiment Station, aimed precisely at clearing up this point and it was purposed to relate and discuss the principal results that have been so far obtained. The experimental data at present include nine lactation periods for heifers fed, since the experiments began, exclusively on alfalfa, and nine lactation periods for heifers of similar age, breed, etc., fed on rations of alfalfa hay, silage, and mixtures of various concentrates (mainly rolled barley, dried beet pulp, coconut meal, and wheat bran).

Details of the two methods of feeding are given. The results clearly indicate the nutritive superiority of the mixed ration compared with that of alfalfa alone, at least so far as gain in live weight is concerned.

If the problem is considered from an economic standpoint, the practical results of feeding dairy cows may vary according to locality and the prices of foods. The problem only can be solved case by case, especially as there are plenty of examples of excellent results obtained by feeding with alfalfa alone. One herd of 23 stall-fed cows under test by one of the Cow-Testing Associations gave a general average of 410 pounds of butter fat on no other food but alfalfa throughout the year. However, it remains an established fact that mixed rations have an absolute superiority in the matter of production and growth, even if the superiority is only relative from an economic standpoint.

96.—**Goat Breeding in the Pastures of the West in the United States.**—CHAPLINE, W. R., in *United States Department of Agriculture*, Bulletin No. 749, 35 pp. Washington, 1919.

This Bulletin constitutes a general treatise on goat breeding in pastures. Numerous problems relating to breeding in open grazing grounds are studied chiefly in connection with:—the nature of the pasture; methods of management which will permit of profitable production of goats without detriment to cattle and sheep or to timber reproduction; increase of revenue derived from goats,

hair and meat by diminishing the losses caused by death; selection and care of the flocks.

The Bulletin ends with a summary of the more important points regarding management and breeding. The author recommends the division of the grazing ground into three parts for use in spring, in summer and autumn, and in winter respectively; the second part should be at the highest elevations, the third in the lowest and most sheltered parts; that portion of the pasture nearest to the sheds should be reserved for use in bad weather.

Over-grazing, which injures the pasture, tree growth, and the yield of stock, should be avoided; an equal or higher revenue will be obtained by grazing, on the same area, a smaller number of selected goats instead of an excessive number of low grade animals.

The most economical and satisfactory results are obtained with flocks of about 1,200 goats; it is best to graze separately goats in milk, dry goats, bucks, yearlings and weaned kids. Goats should be put out to graze for four or five hours in the cool of the morning and for a similar time in the evening; they should rest during the heat of the day. The bed grounds should be changed several times a year; it would be still better to graze the goats for short distances and to bed them at night where they happened to be in the evening; this allows of the grazing of a larger number and increases the production of goats, hair and meat while improving the pasture. The author recommends the Angoras as the breed best suited to the western States of America where goats are kept chiefly for their hair and meat, and secondarily for milk and their skins. Young goats under 18 months of age are not yet suitable for breeding. One buck kept with the does at night and fed with a little grain as a supplementary ration will serve 50 or more does. In 1915 and 1916, for different flocks of Angora goats kept on open grazing grounds in New Mexico, the cost per annum of yearlings was from 95 cents to over \$2 a head, exclusive of interest on the capital and the owner's labour; the average annual revenue for two year olds was about \$2 per head; that for yearlings was slightly higher; the annual cost of pasturage of does and their kids varied from \$1.62 to \$2.78 per doe, and the average annual revenue per doe from \$3 to over \$5.50.

103.—**The Choice of Laying Hens.**—ANDREW, R. C., in *Utility Poultry Journal*, Vol. IV, No. 9, pp. 2-5. Harper Adams Agricultural College, Newport, Salop, 1919.

The improvement of poultry stock can be obtained at small cost and with very little trouble by discarding all the defective birds at the right time, so as to keep only the best.

Age at which the choice of hens to keep and those to discard should be made.—In the egg-laying competitions which were held at Harper Adams Agricultural College, Newport, Salop, England, the following data respectively were obtained in the trials of 1915 to 1917 for 252 hens in the first year of laying, and for an equal number of hens in the second year: Number of eggs laid in a year by the 252 hens: 43,968 and 28,137; average number of eggs per pen of six hens: 1,046.8 and 670 average number per hen: 177.4 and 112; that is to say the hens, in the second year of laying only produced about 60 per cent of the number of eggs laid in the first year. In egg-laying competitions held in Australia the comparison has been carried up to the third year with the following results:—

White Leghorn breed: first year 209 eggs; second year 149; third year 123; Black Orpington breed: respectively 202, 156 and 118. Except in the case of exceptional merit, hens should, therefore, not be kept after the second year of laying.

Time of the year at which bad laying hens should be discarded.—Summer appears to be better than winter for the selection. The egg production by successive periods of four weeks each, dating from the commencement of laying (13 periods for hens in their first year of laying and 12 for those in their second year of laying) determined at Newport, reached its minimum in the third of these periods, its maximum about the seventh and decreased rapidly after the ninth, which ended about the middle of June.

The least profitable time for the selection of hens to be discarded is the beginning of spring, for then the cost of keeping the hens during the unproductive winter has been incurred and by not getting rid of them until a little later they would lay eggs which would cover the expense.

The poultry-keeper often makes the time of selection depend on the amount of food produced on the farm and available during different seasons of the year; but, it is never profitable to keep a hen which does not repay the cost of her food. To ascertain whether the eggs laid cover the cost of the

food consumed by the flock of hens, the following method may be useful: Divide the price of 100 pounds of food by the price of one dozen eggs and multiply the quotient by three; the result gives the number of eggs which should be laid daily by 100 hens to pay for the food. This formula is based on the assumption that each hen consumes four ounces of purchased food per day.

When a hen is in laying condition the pubic bones are relaxed, which increases:—
(1) The distance between these bones; (2) the distance between the hinder end of the breast bone and these bones. Measurements made at Newport have proved that the distance between the pubic bones is on the average 1.3 inches for hens in laying condition and 0.8 inches in non-laying condition, and that the distance between the hinder end of the sternum and the pubic bones for White Leghorns (light breed) and White Wyandottes (heavy breed) respectively, is: hens in laying condition 3.1 inches and 3.6 inches; hens not in laying condition 2.1 inches and 3.29 inches. These differences are sufficiently large to be perceptible, the former when measured by the finger tips and the latter by finger widths. It is better to use fingers than an instrument because by so doing it is possible to feel the texture of the skin.

1202.—The Conformation of the Laying Hen.
—*Utility Poultry Journal*, Vol. III, pp. 24-25. Newport, Salop, 1918.

The annual conference and inspection of the trials held at the Harper Adams Agricultural College, Newport, Salop, England, in August, 1918, led to the appointment of a committee to consider the question of drawing up a standard to which the breeders of utility stock should endeavour to make their birds conform, without sacrificing, if possible, the characteristics of the distinct breeds. With the object of obtaining data upon which to draw up a standard, the college staff, at the request of the committee, undertook a series of measurements in October, 1918, on the birds in a number of representative pens of the various breeds represented.

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The measurements taken were:—

CONFORMATION OF BODY AND LAYING CAPACITY

	240 eggs and over	200-240 eggs	160-200 eggs	120-160 eggs	0-120 eggs
	in.	in.	in.	in.	in.
Breadth of back.....	3.75	3.7	3.5	3.6	3.2
Length of back.....	6.5	6.4	6.4	6.5	6.3
Length of keel.....	4.0	3.9	4.0	4.1	3.9
Abdomen.....	3.5	2.7	2.8	2.4	3.1
Distance between pelvic bones.....	1.2	1.0	0.93	0.98	0.8
Girth measurement.....	14.25	14.0	13.7	13.8	13.4
Wyandotte: abdomen.....	3.7	3.6	3.2	3.4	3.0
Speckled Sussex ".....			3.6	3.2	3.3
Light Sussex ".....			3.6	2.3	2.7
Rhode Island Red ".....		3.6	3.1	2.7	2.7

(1) *Length of back*, from the basal joint of the neck to the oil gland at the base of the tail; (2) *breadth of back*, taken between the inside of the fingers when spanning the depression on the hips; (3) *Length of keel*, from fore end to hind end; (4) *abdomen*, from the end of the keel to the pelvic bones; (5) distance between the pelvic bones; (6) *girth measurement*, taken by passing the tape completely round the bird in the same position as the measurement for breadth of back, the legs of the bird being directed backwards.

The subjoined table gives the averages of each of the six measurements for Leghorns, and only the averages of the fourth measurement for the other breeds, as this figure seems most indicative of laying capacity.

105.—Deer in New-Caledonia; Utilization of their Flesh by Canning.—*Bulletin de l'Office colonial*, Year XII. No. 140-141, pp. 533. Paris-Melun, Aug.-Sept., 1919.

Deer have become an apparently irremediable nuisance in New Caledonia. Near St. Vincent they are met with in numerous herds, and often in groups of over a hundred. They ravage and destroy everything. It is impossible to keep them out by fencing, because they leap the highest barriers. From Noumea to Bourail they infest the whole region.

The Pacific Packing Co., which has a preserving factory at Nemera, is attempting an experiment which will be welcomed by all, and more particularly by colonists and cattle-breeders. This is the preservation of venison. This company buys deer, unskinned and disembowled with care, at a price of 25 fr. a head and it organizes a rapid transport service to the factory by motor lorry. By this fortunate idea, hunting will become a paying business. Every one will use it to rid the colony of this harmful game.

FARM ENGINEERING

1222.—Trials of Mechanical Cultivating Machines in France.—I. SANIER, HENRY, La Semaine de Motoculture de Printemps, in *Journal d'Agriculture Pratique*, Year LXXXIII, New Series, Vol. XXXII, No. II, pp. 214-218, 4 figs. Paris, April 17, 1919. II. La Semaine de Motoculture de Printemps, *Bulletin de la Chambre syndicale de la Motoculture*, No. 4, 56 pp., Paris, April, 1919. III. CLARON, CH., Les Journees de Motoculture des Bouches-du-Rhone, in *Le Progres agricole et viticole*, Year XXXVI, Vol. LXXI, No. 23, pp. 534-539, Montpellier, June 8, 1919.—IV. GREILSAMMER, R., Les tracteurs aux essais de Strasbourg, in *Journal d'Agriculture pratique*, Year LXXXIII, New Series, Vol. XXXII, No. 22, pp. 451-454, Paris, July 3, 1919.

This excellent illustrated article (pp. 1219-1228 of "The International Review of the Science and Practice of Agriculture") will be sent to any one who may desire it.

1225 and 110.—Review of Patents.

In each number of the International Review of the Science and Practice of Agriculture a list of the new patents of agricultural machinery in different countries is given. the following are a few interesting patents mentioned in the last two numbers of the Bulletin received:—

Canada.—190960 Stone collector; 191303 Manure loader; 19134 Straw transporter and spreader; 191371-191539-191679 Apparatus for weed killing; 191732 Stump remover; 191505 Pig Oiler; 191541 Poultry rearer (foster mother); 191212 Support for milk pail; 190790 Cattle counter; 192588 Mechanism for compressing silage.

Netherlands.—3438 Device for fixing strakes or grips to wheels of vehicles, especially for cultural machines; 3446 Pipe for warming

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the soil surface in nurseries and for maintaining its moisture; 3157 Preparation process for a vegetable milk and its derivatives.

United Kingdom.—125815 Hand hoe and seeding machine combined; 126473 Flax pulling machine; 127474 Process for making a soft cheese from skim-milk; 130963 Manure obtained by heating minerals or ground potassic rocks (leucite, volcanic ashes, felspar, granite, etc.) with carbide of calcium, in a current of nitrogen; 129839 Granulated food for poultry (prepared with a sticky mash of ground clover, boiled potatoes, and water, which is divided, dried, roasted, and finally impregnated with fish oil)

United States.—1305059 Harrows with attachment for destroying locusts; 1313310 Machine for destroying weeds.

New Zealand.—40378 Use as manure of flax residues (ash, liquor); 41154 Grass scythe; 40232 Flax scutcher; 40291 Wind motor; 40395 Food mixer for live stock; 39726 Arrangement for preventing cattle and horses from jumping.

France.—402822 Process and plant for rapid cooking and drying of fresh blood as animal food; 393749 Apparatus for sharpening scythes; 493805 Hive, round, made of rye straw, very low interchangeable blocks, and very light interior frames of variable size; suitable covers separate the blocks; the whole is securely fastened with hooks and eyes; 492541 New method of fishing with light.

Switzerland.—82736 Apparatus for separating the seeds of cereals from the seeds of weeds; 73443 Felling and logging machine.

RURAL ECONOMICS

115.—**The Cost of Milk Production Computed on the Year Basis.**—PEARSON, F. A., in *Illinois Agricultural Experiment Station Bulletin* 216, pp. 343-364. Urbana, Ill., 1919.

These studies were undertaken to derive workable formulae that would express the cost of producing fluid milk (for the Chicago market) in terms of amounts of feed and labour used, and not of the monetary value of the expenses incurred.

A study of the herd cost is based upon the records during the fiscal years 1914-15 and 1915-16 of 36 farms on which there were 873 milch cows, 225 calves (and heifers not in milk) and 35 bulls, and where 6,511 pounds of milk and 235 pounds of butter fat were sold per cow during the period. Production in the six winter months was 56 per cent of the yearly total. The gross cost of producing 100 pounds of milk was found to average \$2.25, the percentage of the several items

being: Feed other than pasture 60.7; pasture 5.3; man labour 17; horse labour 3.4; interest on herd 4.9; building charges 3.6; equipment 1.3; and miscellaneous 3.8. A managerial charge was not included. The cost other than for feed (excluding pasture) and man labour totalled 50.16 cents, which almost exactly balanced the 49.69 cents credit from appreciation of stock, manure, hides, beef and other miscellaneous returns. The production cost on these farms can thus be expressed in terms of feed and labour. The amounts per 100 pounds of milk were approximately 44 pounds of grain, 188 pounds of silage and other succulent feed, 50 pounds of hay; 39 pounds of other roughage and bedding; 2.42 hours of man labour. This is the formula for "year cost."

To correct for seasonal variations in cost of production it is suggested that the price of any month be that percentage of the year cost which represents the average variation of that month from the average year price during the period 1907-16. A table showing these monthly percentages is given. It is noted that only 61.8 per cent of the grain fed was purchased, whereas in farms providing milk for New York city the purchased grain was about 98 per cent of the total (A. L. Thompson, *Cost of Producing Milk in 184 Farms in Delaware county, New York*, in the *New York Cornell Station Bulletin* 364, pp. 109-179, 1915).

In 16 of the above farms embracing 428 cows, the records permitted the separation of the cost of rearing young stock from the herd cost, the difference being the "cow cost." The net cost of producing 100 pounds of milk on this basis was \$1.70, which is 215.6 per cent of the cost of feed (excluding pasture) and man labour. The amounts of feed and labour were approximately: Grain 35 pounds; silage 140 pounds; hay 36 pounds; other roughage 29 pounds; and man labour 2.36 hours. To find the year cost on this basis it is necessary to increase the total of these items by 25.6 per cent. Corrections for seasonal variation may be made as before.

A short discussion of some data from 680 dairy farms in Kane and McHenry counties in Illinois is given, mainly to show that the "farm cost", obtained by deducting from the total farm expenses the receipts derived from all sources except the dairy, is a misleading measure of milk production costs.

AGRICULTURAL INDUSTRIES

1239.—**Textilose.**—Breitenstein, A., in *La Revue de la Filature et du Tissage*, Year III, No. 15, pp. 168-170. Epinal.

A new industry is becoming established: the manufacture of yarn and fabrics of paper, either alone or mixed with textile fibres.

The paper is moistened (it may be of advantage to add hygroscopic salts to the water used for this purpose) and cut up in strips which are made into round threads or into cords by spinning, twisting and winding.

In order to get stronger or finer threads, textile fibres, preferably cotton, are mixed with the paper. A carding machine placed in front of the paper machine deposits the fibre on the sheet of pulp and the two materials mix intimately. To accentuate the action of the fibre, the latter may be applied to both sides of the paper.

Yarns of "textilose" seem to have a sure future, especially for the making of packing sheets, carpeting and furniture stuffs, and even for some kinds of dress materials.

1250.—**Fly Pupae in Bottled Milk.**—RILEY, W. A., in *Journal of Dairy Science*, Vol. II, No. 3, pp. 183-188. Baltimore, May, 1919.

The writer found in a quart bottle of certified milk, 30 pupae of *Drosophila ampelophila* attached to the glass. Dr. Feticck mentioned a similar occurrence in 1913 in Budapest. The flies lay their eggs on the interior surface of empty bottles, and within less than a week, the pupae emerge, and attach themselves so firmly to the glass, that they are not removed, even when the bottles, on reaching the dairy, are put through the washing machine. The writer insists upon the necessity of the returned bottles being washed in the dairy in an almost boiling solution of caustic soda, and urges consumers to wash their bottles as soon as they are empty, and to replace the cap.

1252.—**The Household Foam Test for Butter and Oleomargarine.**—SOMMER, H. H., in *Journal of Dairy Science*, Vol. II, No. 2, pp. 142-144. Baltimore, March, 1919.

One of the household tests for distinguishing between butter, and oleomargarine and renovated butter is the "foam test". Butter when heated boils quietly with an abundant production of foam, whereas oleomargarine and renovated butter sputter and do not produce so much foam. The author investigated the cause of this difference, which is the subject of this article, and he came to the following conclusions:—

(1) Fats will foam if the water that they contain is held finely divided in suspension; they sputter if the water gathers in droplets.

(2) The curd in butter is finely divided and holds small particles of water in suspension; therefore butter foams.

(3) The curd in oleomargarine and renovated butter is coarse and allows the water to gather in droplets; therefore oleomargarine and renovated butter sputter.

(4) Certain "butter substitutes" that contain finely divided substances capable of holding water may foam as well as butter.

122.—**Antiseptic Action of Spices in Preserved Foods.**—LAHACHE, JEAN, in *L'Industrie française de la Conserve*, Year V, No. 29, pp. 211-214. Paris, August, 1919.

The author gives an account of investigations on the antiseptic action of spices in preserved foods. All this subject is, so to speak, in its infancy, and will be continued. But already attention should be drawn to the preliminary results obtained, which establish absolutely the antiseptic action of certain spices. The spices most generally used are black pepper, Cayenne pepper, ginger, mustard, cinnamon and cloves. The first three, in the experiments, only prevented fermentation and putrefaction for a very short time. But mustard, cinnamon and cloves (whose antiseptic principles are their essential oils) are much more effective. They are powerful antiseptics, even in the small quantities in which they are used in food industries. Anyhow, these spices have an antiseptic action decidedly greater than that of the usual chemical antiseptics of which, moreover, the use is expressly prohibited by French law, while that of spices is legally permissible and is in no way contrary to hygiene.

1258.—**Preparation of Strawberries for Market.**—MORE, C. T., and TRUAX, H. E., in *Farmers' Bulletin* 979, *United States Department of Agriculture*, pp. 27. Washington, D.C., May, 1918.

This bulletin describes efficient methods of preparing strawberries for market. The phases discussed include importance of good handling, the labour problem, picking, grading, commercial strawberry grades recommended, packing, packing sheds, shipping packages, standardization of package, branding and marking, inspection and loading sheds, and loading cars.

PLANT DISEASES

135.—**Chemical Investigations on Agents for Combatting Fungoid Diseases and Insects.**

—(1) MOND, E. L. and HEBERLEIN, C., in *Journal of the Chemical Society*, Vols. 115-116, No. 682, pp. 908-922, London, August, 1919.—(2) RAMSAY, A. A., in *The Agricultural Gazette of New South Wales*, Vol. XXX, Pt. 6, pp. 428-429. Sydney, June, 1919.

The first part of the article deals with the chemistry of Burgundy mixtures.

The question of combining insecticides and fungicides in the treatment of orchard pests is attracting more and more attention, for the obvious reason that such combinations

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may represent substantial savings both in time and money.

The diagram is supplemented by the table indicating what mixtures may safely be made and also the unreliable sprays.

TABLE OF COMPATIBLE AND NON-COMPATIBLE SPRAYS

Spray	May be mixed with	Must not be mixed with
Alkali sulphides (liver of sulphur).	Soap, washing soda.....	Bordeaux, Burgundy, lead arsenate, Paris green.
Ammonia copper carbonate.	Tobacco infusions, concentrated tobacco extracts.	Bordeaux, Burgundy, lead arsenate, Paris green.
Bordeaux mixture.....	Lead arsenate, Paris green, concentrated tobacco extracts, tobacco infusions, soap.	Alkali sulphides, lime-sulphur, certain oil emulsions, resin wash, washing soda.
Burgundy mixture.....	Concentrated tobacco extracts	Alkali sulphides, lead arsenate, lime sulphur, Paris green, resin wash, soap, washing soda.
Ferrous sulphate and sulphuric acid.	To be used alone.....	
Iron sulphide.....	Bordeaux, lime-sulphur.....	
Lead arsenate.....	Bordeaux, lime-sulphur, sulphur (atomic) concentrated tobacco extracts, tobacco infusions.	Ammonia copper carbonate, alkali sulphides, resin wash, soap, tobacco infusions, washing soda.
Lime-sulphur.....	Iron sulphide, lead arsenate, concentrated tobacco extracts.	Bordeaux, Burgundy, resin wash, soap, tobacco infusions, washing soda.
Paris green.....	Bordeaux, concentrated tobacco extracts	Alkali sulphides, ammonia copper carbonate, resin wash, soap, washing soda.
Resin wash.....	Kerosene emulsion, concentrated tobacco extracts.	Bordeaux, Burgundy, lead arsenate, lime-sulphur, Paris green, tobacco infusions.
Soap.....	Alkali sulphides, Bordeaux, tobacco infusions, concentrated tobacco extracts, resin wash, washing soda.	Burgundy, lime-sulphur, lead arsenate, Paris green.
Sulphur (atomic).....	Lead arsenate, Paris green.....	
Soap-oil emulsions.....		Lead arsenate.
Tobacco extracts, concentrated.	Ammonia copper carbonate, Bordeaux, Burgundy, lead arsenate, lime sulphur, oil emulsions, resin wash, soap, tobacco infusions, washing soda.	
Tobacco infusions.....	Ammonia copper carbonate, alkali sulphides, lead arsenate, soap, concentrated tobacco extracts, washing soda.	Lime sulphur, lead arsenate, Paris green.
Washing soda.....	Alkali sulphides, emulsified oils, soap, concentrated tobacco extracts, tobacco infusions.	Burgundy, Bordeaux, lead arsenate, lime-sulphur, Paris green.

142.—Experiments with Tumours Caused by Bacteria in Pines.—DUFRENOY, J., in *Comptes rendus des seances de l'Academie des Sciences*, 2nd Half 1919, Vol. CLXIX, No. 12 (Sept., 22 1919), pp. 545-547. Paris, 1919.

At Bareges (in the upper Pyrenees Department), *Pinus sylvestris* and *P. Laricio* are deformed by resinous swellings of bacterial origin, identical with those on the maritime pine, and, as experiments have shown, transmissible from tree to tree.

The action of the *Coccus* on the pine, while at first stimulating, brings on the development of hyperplasia, cells filling up air spaces or canals, sacs especially on the border of medullary rays. Finally there follows the resinous liquidation of the tissues.

1263.—The Metagenetic Stage of Leptosphaeria Tritici, an Ascomycete Injurious to Wheat.—DURRELL, L. W., in *Science*, New Series, Vol. L, No. 1289, pp. 252-253. Lancaster, Pa., September 12, 1919.

In the state of Iowa, United States, a species of what seemed to be an *Ascochyta* has frequently been found on dead straw. Recently, while cultivating *Leptosphaeria tritici*, the relationship existing between these two forms was revealed.

The pycnidial fruiting bodies grow side by side with the perithecia of *L. tritici* on dead wheat straw in the spring, and are difficult to distinguish from them, both being dark, submerged, and of the same size, though the ostioles of the perithecia are more protruding. The pycnidia are filled with gluttulate stylospores, usually divided by a transverse septum; their size, shape and manner of production suggest *Ascochyta graminicola* as described by Frank. Single spore cultures of the ascospores of *L. tritici* obtained by the Hansen method of isolation, produce on potato agar, and on sterile straw, pycnidia and stylospores like those found growing on the wheat plant together with the perithecia of *L. tritici*.

1265.—Formaldehyde as a Means of Controlling Wheat Scab (*Gibberella Saubinetii*) and Other Seed-Borne Diseases of Cereals.—MELHUS, J. E., and RHODES, L. L., in *Science*, New Series, Vol. 2, No. 1279, p. 21. Lancaster, Pa., July 4, 1919.

Experiments carried out at the Iowa Experiment Station, United States, for the purpose of ascertaining the effect of hot formaldehyde upon *Gibberella Saubinetii*, proved that placing wheat in a formaldehyde solution at 50°C. such as is used in the case of potato scab (*Oospora scabies*), was either ineffective in killing the fungus or destructive to the viability of the seed.

In order to overcome these difficulties, the grain was suspended just above the formaldehyde solution (one part in 240 parts of water), and the temperature raised to 98-99°C., the time of exposure being reduced to 20 seconds.

Under these conditions, all the fungi in, or on, the seed were killed, and in the majority of cases the bacteria were also eliminated. This momentary treatment did not injure the germinating capacity of the seed. The fungoid flora of wheat seeds was destroyed in 20 seconds, while the germinating capacity of the grain was not injured in 40 seconds, and only slightly impaired in 50 seconds. It is believed that this method can be made practical for the control of *G. Saubinetii* and other seed-borne diseases of cereals.

1268.—*Bacterium Translucens* Var. *Undulosum* N. Var. Injurious to Wheat in the United States.—SMITH, E. F., JOES, L. R., and REDDY, C. S., in *Science*, New Series, Vol. L, No. 1280, p. 48. Lancaster, Pa., July 11, 1919.

The continued prevalence in the United States of the disease known as black chaff

of wheat makes it desirable to have a scientific Latin name for the bacterial organism causing it. This micro-organism resembles *Bacterium translucens*, the cause of the bacterial blight of barley. In cross-inoculations on the leaves of seedling plants the barley micro-organism on wheat has proved either non-infectious, or has produced small non-typical lesions.

On the other hand, inoculation experiments have shown that the wheat micro-organism is practically as pathogenic on barley as it is on wheat, and the lesions so produced on barley are indistinguishable from those produced by the barley micro-organism itself. Therefore, the authors suggest that for the present at least, the wheat micro-organism be distinguished as *Bacterium translucens* var. *undulosum* n. var. with, in general, the characteristics already given for the species. *Bact. translucens* var. *undulosum* produces yellow or translucent stripes on leaves, water-soaked or black stripes on culms, and longitudinal, more or less sunken stripes or spots on the glumes. In moist weather, the bacteria often ooze to the surface of the diseased spots or stripes as tiny drops that become yellowish on drying. The bacterium attacks also the kernels, especially at the base, causing them to be shrunken and honey-combed with bacterial pockets. Even when the kernels are not directly attacked, their surface is liable to be infected from the diseased glumes. When the disease is severe, the heads are dwarfed.

In the infection experiments carried out, positive results were repeatedly obtained on wheat leaves and glumes. The disease is transmitted to young seedlings by way of the wheat kernels. It occurs in all the wheat states of the middle west.

1270.—*Oospora Pustulans* n.sp., a Hyphomycete Causing the Skin Spot Disease of Potato Tubers in the United Kingdom and Canada.—OWEN, M. N., in *Royal Botanic Gardens, Kew, Bulletin of Miscellaneous Information*, No. 8, pp. 289-301. London, 1919.

It was proved by the experiments carried out by the author at Kew, that the disease of potato tubers known in England (Lincolnshire), Ireland, and Canada (Quebec) by the name of skin spot is caused by a fungus belonging to the Hyphomycetes. The fungus is not *Spicaria Solani* Harting, as had been previously thought, but a minute species hitherto undescribed which appears most suitably placed in the genus *Oospora*, and is described as a new species, *O. pustulans* (Owen and Wakefield).

This mucedinacea grows readily as a saprophyte in culture (agar, gelatine, etc.), but more freely on sterilized vegetable tissues.

Field inoculations with spores of the fungus gave positive results in a certain number of cases, the characteristic spots being produced on the tubers, and the fungus was re-isolated from the affected tubers. Further work on the life-history of this hyphomycete is required, as it is not certain whether the tubers are infected in the soil only, or also during storage. The exact type of soil, and the general conditions under which skin spot develops with special virulence are not yet clear.

With regard to the injury caused by the disease, the fungus is confined to the surface layers and is often sharply isolated from the mass of the flesh by a layer of cork cells.

The only preventive measure which can be recommended at present is to avoid planting diseased tubers. If badly-affected tubers are planted, not only are "misses" (failures in germination) likely to occur, but the soil will probably be seriously infected with the skin spot fungus.

INJURIOUS INSECTS

143.—Legumes of the Genus *Deguelia* (Derris) and their Use in Checking Insects and other Injurious Invertebrates.—McINDOO, N. E., SIEVERS, A. F., and ABBOTT, W. S., in *Journal of Agricultural Research*, Vol. XVII, No. 5, pp. 177-200. Washington, D.C., August 15, 1919.

The genus *Deguelia* Aubl.—synonymous with *Derris* Lour.—belongs to the leguminous family and includes several species already found to be insecticides or poisonous; the ground roots of one species, probably *Deguelia elliptica* (Wall.) Janb.—synonymous with *Derris elliptica* (Wall.) Benth.—are sold as an insecticide; *D. elliptica* is a strong fish poison and is much used in the East Indies for catching fish.

Of the different insecticides on sale, some act on the stomachs of insects affected, others by contact; the authors show that powdered roots of *D. elliptica* and *D. uliginosa* (DC) Baill.—syn. *Derris uliginosa* (DC) Benth.—act at the same time in both ways, but are of no value as fumigators.

The authors studied the following materials: powdered roots of a species of *Derris*, probably *D. elliptica* bought on the market; roots of *D. elliptica* called "tuba", or "toeba" in the Dutch East Indies, from Buitenzorg (Java); stems of *D. uliginosa* from Sauva (Fiji Islands); stems of *D. Koolgibberah* Baill. and of *D. oligosperma* from Brisbane (Queensland, Australia); roots of *D. scandens* Benth., and roots and stems of *D. robusta* Benth. from Sibpur (Calcutta, India).

On extraction with boiling denatured alcohol, they obtained from these substances

the following percentages of extract; respectively 14.25, 8.50, 8.50, 10.30, 22.50, 20.30, 16.70 (roots of *D. robusta*) and 15.70 (stems of same species.) Of the six species tried, only two, *D. elliptica* and *D. uliginosa*, were found satisfactory for use as insecticides.

Several writers state that the toxic principle of the *Deguelia* species is a resin that acts on the different classes of animals according to the development of their nervous system. It kills some insects easily, others with difficulty, but usually its action is slow and it apparently causes death by paralyzing the motor organs. The extract obtained with denatured alcohol applied in the form of a spraying mixture has proved effective on certain aphidae (*Myzus persicae*, *Macrosiphum liriiodendri*, *Rhopalosiphum pseudobrassicæ*, *Aphis helianthi*, *A. gossypii*, *A. spiræcola*), and on larvae of *Leptinotarsa decemlineata* and the small caterpillars of *Hyphantria cunea*. It is possible to incorporate extracts of *D. elliptica* and *D. uliginosa* in soft soap; by simply dissolving them in plenty of water a solution ready for spraying can be obtained.

It has been found that commercial *Derris* sp. powder as ordinarily used is efficacious against dog fleas (*Ctenocephalus canis*) chicken lice (several species of *Mallophaga*), the house fly, three species of aphids (*Aphis rumicis*, *A. pomi*, *Myzus persicae*), the larvae of *Leptinotarsa decemlineata* and the small caterpillars of *Hyphantria cunea*, but it is of no practical value against bed bugs (*Cimex lectularius*), roaches (*Blattella germanica*), chicken mites (*Dermanyssus gallinæ*), mealy bug of lemon and orange trees (*Pseudococcus citri*), *Orthezia insignis*, *Tetranychus bimaculatus*, larvae of *Lepidosaphis ulmi*. Used as a powder in suspension in water, with or without soap, under practical conditions, it was effective against most of the aphids tried, and against the caterpillars of *Autographa brassicæ*, *Datana ministra*, *Asinota senatoria*, *Malacosoma americana* and the larvae of *Leptinotarsa decemlineata*.

148.—The Destruction of the Rice Weevil with Chloropicrin.—BERTRAND, G., BROCC-ROUSSEAU and DASSONVILLE, in *Comptes rendus des seances de l'Academie des Sciences*, Vol. CLXIX, No. 19 (Nov. 10, 1919), pp. 880-882. Paris, 1919.

These investigations were made on the rice weevil (*Calandra oryzae* Ls.) which is very prevalent in maize grains.

The authors first examined the effect of poisonous vapour on the weevil outside the grain, using the same methods as in their researches on bed bugs; 560 specimens were utilized.

The authors tried to find by means of the results the conditions under which, in practice, the weevils contained in grain could be

destroyed. One hectolitre of infested maize which they used had an apparent density of 0.715 and included 62 litres of actual grain and 38 of interstitial air. If it had been necessary, in order to kill the weevils, only to vaporize the proportions of chloropicrin indicated in the annexed table, a few grammes of this substance per hectolitre would have been sufficient. The insect, however, is sheltered inside the grain and the latter holds, at least for a time, a small proportion of the poison vapour. Hence it is necessary as the experiments demonstrate, to use more chloropicrin in order to kill the weevils contained inside the grain than to kill those outside.

By varying the conditions of experiment, the authors saw that the quantities required vary appreciably according to circumstances, such as: depth of the layer of grain, duration

of contact with chloropicrin vapour, temperature, etc.

Direct treatment of the grain in bags, which is at once the most practical and difficult method, was successfully carried out in consequence of the authors' experiments: by pouring from 20 to 25 gm. of chloropicrin on to each bag lying on the ground in a closed chamber, twenty hours were long enough to ensure the death of all weevils, at a constant temperature of 10-12°C. The insects killed were almost all outside the grain; they may easily be got rid of by winnowing, and the grain may be fed to stock.

This method being very simple and effective ensures at once and at the same time the destruction of the insects which manage to get out of the grain and hide in cracks of the wall or floors in the chamber where the treatment is carried out.

THE INTERNATIONAL REVIEW OF AGRICULTURAL ECONOMICS

The following is a brief indication of the contents of the more important articles in the November, 1920, number of the Institute Economic Bulletin. Persons interested in any of the articles may obtain the original Bulletin on application to the Institute Branch, Department of Agriculture, so long as the supply for distribution is not exhausted.

Co-operative Dairies in Germany during the War.—18 pages. Gives an account of the general conditions of these dairies during the war, their liabilities and assets, work, and financial results.

The Operations of the United States Federal Farm Loan Board in 1919.—15 pages. This article, which is based on the third annual report of the Federal Farm Loan Board, discusses the subject under the following heads: number and operations of the joint-stock land banks; appraisal system; national farm loan associations; land speculation;

earnings of banks; purposes of loans; corroboration of appraisements; general assistance to agriculture; proposed amendments; service as agents of the Government.

The Increase in Agricultural Wages in France, from 1915 to 1920.—17 pages.

New Tendencies in the Recent Changes in Agricultural Agreements in Italy.—8 pages. Discusses the vocational organization of the peasants, the demand for higher remuneration, the desire of the peasantry to control the management of the land, and the action of the State.

Some of the shorter articles are: The Development of Co-operative Distribution Societies in Country Districts in France; Co-operative Dairies in Sweden in 1918; The Swiss Central Butter Control; The Large Mutual Live Stock Insurance Companies in France in 1919; Mutual Agricultural Insurance Societies in Italy.

AGRICULTURAL STATISTICS

THE CROPS OF 1920—WORLD'S WHEAT AND LIVE STOCK SITUATION

BY T. K. DOHERTY

THE prices of cereals have fallen very rapidly since the middle of 1920 and now approximate the prices being paid for other commodities. During a certain period of the war cereal prices maintained a certain margin of advantage. In 1914 and again in 1916 there was an agreement between them, but in the interval between 1916 and the close of 1920, the prices of wheat were higher than those of commodities, and the margin was quite important in the early part of 1917 and the earlier part of 1920. The high cost of production of the crops of 1920, together with the rapid decline of prices latterly, in some cases even to a point below the cost of production, are factors which bear very rapidly on the producers. The producers are therefore interested in having as much information as possible on the actual situation. The purpose of this article is to give this information as fully as possible in regard to all the chief farm crops and live stock, with some particular attention to the wheat crop, concerning which so much more information is available.

Before entering into details in regard to wheat in particular, it is well to recall the very violent fluctuations in the price of wheat in England during the Napoleonic wars and in the years following the conclusion of peace in 1815. The following table contains these prices year by year from 1800 to 1822:

1800.....	\$	3 47
1801.....		3 62
1802.....		2 13
1803.....		1 80
1804.....		1 89
1805.....		2 74
1806.....		2 40
1807.....		2 28
1808.....		2 47
1809.....		2 95
1810.....		3 22
1811.....		2 91
1812.....		3 84
1813.....		3 34
1814.....		2 27
1815.....		2 01
1816.....		2 38
1817.....		2 92
1818.....		2 62
1819.....		2 27
1820.....		2 07
1821.....		1 71
1822.....		1 37

The high prices culminated in 1812 at \$3.84 a bushel, when the Duke of Wellington was fighting Napoleon in Spain and our own war with the United States had started. With the failure of the French invasion of

Russia in 1812 there was an extreme decrease of price to \$2.01 in 1815 until the battle of Waterloo, when a rise started which reached \$2.92 in 1817, then subsided gradually during the next five years so that it reached the lowest price of \$1.37 in 1822. This course of wheat prices at that time represents somewhat of an index to the prices of other grains and commodities. Our own markets have during the war paralleled the situation to some extent. They have paralleled it for the couple of years following peace, when our high prices coincided with those which prevailed in 1816, 1817, and 1818. At the present time, however the decline in the price of wheat has been much more rapid and considerable than in the years following Napoleon's final defeat. However, the present decline may be overdone, and we may still witness a further coincidence with the post Napoleonic period.}]

In order to arrive at a satisfactory understanding of the present situation it will be well to examine the original statistical data furnished for the most part by the International Institute of Agriculture, and supplemented from other reliable commercial agencies. In the following pages will be presented:}]

(1) A series of tables giving for 1919 and 1920 and the average of 1914-18 the acreage and production of wheat, rye, barley, oats, corn, rice, flaxseed and fibre, potatoes and sugarbeets. The figures in these tables are all furnished by the different Governments. The totals have not been given, because the official figures for certain countries for certain years have not been received. The new countries that have resulted from the Peace Treaty are chiefly the ones in which deficiencies exist.

(2) There is presented a table giving the world's production of wheat by countries for 1919 and 1920 compared with the pre-war average.

(3) A table giving the exports of wheat by exporting countries from 1913-14 to 1919-20 and the pre-war five-year average.

(4) A table giving the monthly exports of wheat and flour by the United States and Canada.

(5) The imports of wheat by Great Britain, France, Italy, and Belgium for August, September, and October, 1920.

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(6) Broomhall's estimated requirements of importing countries for the current season, with comment.

(7) Estimates of supply and demand situation with regard to wheat.

(8) Tables giving the numbers of cattle, sheep and swine in different countries.

Table 1

WHEAT

Countries	Area Thousands of acres			Production Thousands of bushels		
	1920	1919	Average 1914-18	1920	1919	Average 1914-18
Germany.....	3,427	3,161	4,064	78,925	79,702	111,550
Belgium.....	282	329	.....	7,949	9,895	7,935
Bulgaria.....	2,154	2,080	2,415	41,190	34,029	29,308
Denmark.....	165	125	144	6,945	5,923	6,088
Spain.....	10,050	10,378	10,086	134,457	129,251	137,221
Jugo-Slavia.....	3,952	3,380	.....	64,712	50,956	.....
Finland.....	19	19	18	272	306	229
France.....	11,995	11,376	12,464	230,406	182,446	214,139
England and Wales.....	1,875	2,221	2,073	53,416	63,808	64,483
Scotland.....	54	79	68	2,080	3,064	2,687
Ireland.....	50	70	96	.....	2,452	3,549
Greece.....	.....	936	.....	13,288	9,693	.....
Hungary.....	2,081	.....	.....	29,139	.....	.....
Italy.....	11,292	10,592	11,462	141,338	169,771	167,991
Norway.....	41	41	20	1,035	1,071	477
Netherlands.....	156	168	143	6,677	5,763	5,320
Poland.....	.....	1,064	.....	18,258	15,754	.....
Roumania.....	2,072	2,965	4,690	24,001	48,492	58,263
Bessarabia.....	1,353	1,273	1,707	17,815	16,988	18,569
Bukovina.....	26	33	.....	.....	580	.....
Transylvania.....	1,704	.....	.....	.....	.....	.....
Sweden.....	360	348	326	11,133	9,509	8,707
Switzerland.....	119	130	130	3,586	3,524	4,205
Czecho-Slovakia.....	1,494	.....	.....	24,453	.....	.....
Canada.....	18,232	19,126	14,576	263,189	193,260	248,084
United States.....	57,192	72,308	54,119	787,128	934,265	822,246
Guatemala.....	24	21	27	312	251	632
India.....	29,975 ^a	23,797	31,941	376,768	280,299	352,986
Japan.....	1,335	1,344	1,297	29,477	30,676	27,802
Algeria.....	2,647	2,800	3,251	8,929	19,166	33,191
Egypt.....	1,190	1,323	1,349	31,711	30,137	34,186
Morocco.....	1,974	1,551	1,551	17,637	.....	18,654
Tunis.....	1,211	1,400	1,378	4,766	6,981	7,047

^a It is estimated that there has been a decrease in area in the 1921 crop of about 4,000,000 acres.

Table 2

RYE

Countries	Area Thousands of acres			Production Thousands of bushels		
	1920	1919	Average 1914-18	1920	1919	Average 1914-18
Germany.....	10,703	10,842	14,748	189,558	240,163	341,188
Belgium.....	506	496	.....	13,701	13,681	11,093
Bulgaria.....	417	446	480	8,931	6,490	5,800
Denmark.....	519	559	518	12,614	14,909	11,306
Spain.....	1,920	1,808	1,835	32,053	23,297	26,697
Jugo-Slavia.....	948	682	.....	18,125	9,816	.....
Finland.....	602	602	584	9,173	10,505	9,990
France.....	2,000	1,907	2,130	33,174	28,736	32,794
England and Wales.....	96	107	63	.....	.....	.....
Scotland.....	7	6	.....	.....	.....	.....
Ireland.....	6	5	7	.....	.....	.....
Greece.....	.....	58	.....	1,307	1,081	219
Hungary.....	1,248	.....	.....	16,520	.....	.....
Italy.....	282	273	286	4,539	4,571	4,931
Norway.....	37	37	46	990	983	1,179
Netherlands.....	489	497	509	14,223	14,493	13,301
Poland.....	.....	6,545	.....	74,842	103,044	.....
Roumania.....	182	219	191	1,972	3,430	1,890
Bessarabia.....	275	482	445	3,778	5,890	4,632
Bukovina.....	35	47	.....	.....	726	.....
Transylvania.....	190	.....	.....	.....	.....	.....
Sweden.....	914	920	921	24,959	23,073	21,092
Switzerland.....	50	55	58	1,622	1,575	1,676
Czecho-Slovakia.....	2,185	.....	.....	33,439	.....	.....
Canada.....	650	753	230	11,306	10,207	3,948
United States.....	5,043	7,103	3,918	69,318	88,909	59,932

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BARLEY

Table 3

Countries	Area Thousands of acres			Production Thousands of bushels		
	1920	1919	Average 1914-18	1920	1919	Average 1914-18
Germany.....	3,273	3,081	3,652	87,742	111,115	
Belgium.....	87	75		3,842	3,617	
Bulgaria.....	502	474	587	12,511	10,371	10,048
Denmark.....	585	569	603	23,548	24,522	22,987
Spain.....	4,265	4,254	3,858	89,146	81,809	82,071
Jugo-Slavia.....	1,182			20,654		
Finland.....	293	293	283	4,983	5,295	4,527
France.....	1,495	1,387	1,593	35,400	22,964	35,923
England and Wales.....	1,637	1,510	1,406	52,800	45,617	46,242
Scotland.....	204	174	165	8,108	6,367	6,373
Ireland.....	208	187	165		8,125	7,346
Greece.....		300		7,183	5,020	
Hungary.....	1,201			20,045		
Italy.....	494	480	552	5,870	8,327	9,037
Norway.....	156	156	111	5,427	5,275	3,729
Netherlands.....	56	57	60	2,846	2,387	2,718
Poland.....		1,315		39,309	27,843	
Roumania.....	1,116	587	1,210	21,701	11,797	21,484
Bessarabia.....	1,837	1,297	1,819	26,483	18,875	21,462
Bukovina.....	47	58			969	
Transylvania.....	308					
Sweden.....	402	412	429	11,115	12,892	12,538
Switzerland.....	18	19	18	620	625	617
Czecho-Slovakia.....	1,695			38,618		
Canada.....	2,552	2,646	2,112	63,311	56,389	53,067
United States.....	8,083	7,198	8,229	202,024	161,345	214,819
Japan.....	2,691	2,893	3,066	95,840	95,339	94,746
Algeria.....	2,444	2,640	2,896	9,526	25,538	40,108
Egypt.....	340	357	426	7,475	10,087	12,296
Morocco.....	1,903	1,523	1,970	30,314		32,143
Tunis.....	939	1,105	1,145	3,169	5,512	7,918

OATS

Table 4

Countries	Area Thousands of acres			Production Thousands of bushels		
	1920	1919	Average 1914-18	1920	1919	Average 1914-18
Germany.....	8,006	7,240	9,430	291,380	388,719	
Belgium.....	537	550		26,237	25,337	
Bulgaria.....	319	301	364	9,159	6,953	6,330
Denmark.....	1,001	961	1,008	44,494	44,786	43,379
Spain.....	1,574	1,595	1,402	37,294	30,979	30,847
Jugo-Slavia.....	1,036			26,916		
Finland.....	1,013	1,013	969	23,116	22,714	23,663
France.....	8,065	7,055	7,748	273,814	161,688	230,546
England and Wales.....	2,264	2,564	2,228	98,739	104,768	102,056
Scotland.....	1,032	1,111	1,035	47,323	48,681	47,600
Ireland.....	1,331	1,442	1,246		80,508	73,469
Greece.....		155		3,761	3,884	
Hungary.....	836			21,761		
Italy.....	1,159	1,129	1,169	22,798	32,654	30,793
Norway.....	343	343	314	14,262	14,217	13,951
Netherlands.....	392	389	365	22,857	19,446	19,858
Poland.....		2,441		104,922	71,795	
Roumania.....	1,136	597	1,001	28,453	13,433	20,986
Bessarabia.....	281	305	231	6,565	6,931	4,652
Bukovina.....	46	49			1,117	
Transylvania.....	590					
Sweden.....	1,758	1,762	1,911	62,313	72,087	65,205
Switzerland.....	56	57	79	2,931	2,607	4,575
Czecho-Slovakia.....	1,947			52,594		
Canada.....	15,850	14,952	12,150	530,710	394,387	403,513
United States.....	43,323	41,835	41,773	1,526,055	1,231,754	1,414,558
Japan.....	282	218	147	10,506	8,715	5,899
Algeria.....	576	533	594	4,761	10,008	14,495
Morocco.....	6	7	6			165
Tunis.....	124	135	145	1,427	2,918	3,046

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Table 5

CORN

Countries	Area Thousands of acres			Production Thousands of bushels		
	1920	1919	Average 1914-18	1920	1919	Average 1914-18
Bulgaria.....	1,419	1,392	1,458	39,650	.....	20,797
Spain.....	1,167	1,179	1,158	27,377	25,555	28,315
Jugo-Slavia.....	3,018	.....	.....	86,556	.....	.....
France.....	792	736	909	.....	9,976	16,187
Hungary.....	1,894	.....	.....	48,320	.....	.....
Italy.....	3,707	3,709	3,826	86,610	85,846	93,888
Poland.....	.....	.....	.....	1,527	.....	.....
Roumania.....	4,831	4,862	4,903	71,701	102,229	75,643
Bessarabia.....	1,264	1,727	1,686	21,250	32,022	26,082
Bukovina.....	89	162	.....	.....	3,162	.....
Transylvania.....	1,146	.....	.....	.....	.....	.....
Switzerland.....	6	6	4	280	287	209
Czecho-Slovakia.....	292	.....	.....	6,299	.....	.....
Canada.....	292	265	233	14,335	16,941	11,308
United States.....	104,601	100,072	107,225	3,232,367	2,858,509	2,760,484
Guatemala.....	553	674	599	4,062	4,939	9,398
Indo-China.....	400	.....	344	5,733	.....	6,286
Japan.....	139	136	143	.....	.....	3,834
Algeria.....	22	15	.....	253	236	.....
Morocco.....	292	.....	435	2,858	.....	3,854
Tunis.....	30	45	45	197	256	229

Table 6

RICE

Countries	Area Thousands of acres			Production Thousands of bushels		
	1920	1919	Average 1914-18	1920	1919	Average 1914-18
Bulgaria.....	8	4	8	297	118	208
Spain.....	120	112	103	13,956	14,832	11,454
Italy.....	284	325	351	21,070	23,848	26,220
United States.....	1,337	1,092	893	53,710	42,790	33,360
Guatemala.....	6	14	24	80	187	472
India.....	72,820	78,391	78,604	.....	2,740,678	2,395,349
Indo-China.....	11,761	.....	10,151	226,254	.....	284,541
Japan.....	.....	7,608	7,518	550,703	538,911	497,354
Egypt.....	140	150	237	22,814	21,851	14,554

Table 7

(a) Seed (b) Fibre
FLAX

Countries	Area Thousands of acres			Production Seed, thousand bushels Fibre, thousand pounds						
	1920	1919	Average 1914-18	1920	1919	Average 1914-18				
Belgium.....	121	48	.....	(a) 886 (b) 76,654	407 29,983	.....			
Bulgaria.....	1	.....	1	(a) 13 (b) 551	.....	.....		
Spain.....	2	2	3	(a) 52 (b) 705	42 970	.....			
Finland.....	14	.....	.....	.....	.....	.....
France.....	61	38	27	(a) (b) (c) (d) (e) (f) (g) (h) (i) (j) (k) (l) (m) (n) (o) (p) (q) (r) (s) (t) (u) (v) (w) (x) (y) (z) (aa) (ab) (ac) (ad) (ae) (af) (ag) (ah) (ai) (aj) (ak) (al) (am) (an) (ao) (ap) (aq) (ar) (as) (at) (au) (av) (aw) (ax) (ay) (az) (ba) (bb) (bc) (bd) (be) (bf) (bg) (bh) (bi) (bj) (bk) (bl) (bm) (bn) (bo) (bp) (bq) (br) (bs) (bt) (bu) (bv) (bw) (bx) (by) (bz) (ca) (cb) (cc) (cd) (ce) (cf) (cg) (ch) (ci) (cj) (ck) (cl) (cm) (cn) (co) (cp) (cq) (cr) (cs) (ct) (cu) (cv) (cw) (cx) (cy) (cz) (da) (db) (dc) (dd) (de) (df) (dg) (dh) (di) (dj) (dk) (dl) (dm) (dn) (do) (dp) (dq) (dr) (ds) (dt) (du) (dv) (dw) (dx) (dy) (dz) (ea) (eb) (ec) (ed) (ee) (ef) (eg) (eh) (ei) (ej) (ek) (el) (em) (en) (eo) (ep) (eq) (er) (es) (et) (eu) (ev) (ew) (ex) (ey) (ez) (fa) (fb) (fc) (fd) (fe) (ff) (fg) (fh) (fi) (fj) (fk) (fl) (fm) (fn) (fo) (fp) (fq) (fr) (fs) (ft) (fu) (fv) (fw) (fx) (fy) (fz) (ga) (gb) (gc) (gd) (ge) (gf) (gg) (gh) (gi) (gj) (gk) (gl) (gm) (gn) (go) (gp) (gq) (gr) (gs) (gt) (gu) (gv) (gw) (gx) (gy) (gz) (ha) (hb) (hc) (hd) (he) (hf) (hg) (hh) (hi) (hj) (hk) (hl) (hm) (hn) (ho) (hp) (hq) (hr) (hs) (ht) (hu) (hv) (hw) (hx) (hy) (hz) (ia) (ib) (ic) (id) (ie) (if) (ig) (ih) (ii) (ij) (ik) (il) (im) (in) (io) (ip) (iq) (ir) (is) (it) (iu) (iv) (iw) (ix) (iy) (iz) (ja) (jb) (jc) (jd) (je) (jf) (jg) (jh) (ji) (jj) (jk) (jl) (jm) (jn) (jo) (jp) (jq) (jr) (js) (jt) (ju) (jv) (jw) (jx) (jy) (jz) (ka) (kb) (kc) (kd) (ke) (kf) (kg) (kh) (ki) (kj) (kl) (km) (kn) (ko) (kp) (kq) (kr) (ks) (kt) (ku) (kv) (kw) (kx) (ky) (kz) (la) (lb) (lc) (ld) (le) (lf) (lg) (lh) (li) (lj) (lk) (lm) (ln) (lo) (lp) (lq) (lr) (ls) (lt) (lu) (lv) (lw) (lx) (ly) (lz) (ma) (mb) (mc) (md) (me) (mf) (mg) (mh) (mi) (mj) (mk) (ml) (mn) (mo) (mp) (mq) (mr) (ms) (mt) (mu) (mv) (mw) (mx) (my) (mz) (na) (nb) (nc) (nd) (ne) (nf) (ng) (nh) (ni) (nj) (nk) (nl) (nm) (nn) (no) (np) (nq) (nr) (ns) (nt) (nu) (nv) (nw) (nx) (ny) (nz) (oa) (ob) (oc) (od) (oe) (of) (og) (oh) (oi) (oj) (ok) (ol) (om) (on) (oo) (op) (oq) (or) (os) (ot) (ou) (ov) (ow) (ox) (oy) (oz) (pa) (pb) (pc) (pd) (pe) (pf) (pg) (ph) (pi) (pj) (pk) (pl) (pm) (pn) (po) (pp) (pq) (pr) (ps) (pt) (pu) (pv) (pw) (px) (py) (pz) (qa) (qb) (qc) (qd) (qe) (qf) (qg) (qh) (qi) (qj) (qk) (ql) (qm) (qn) (qo) (qp) (qq) (qr) (qs) (qt) (qu) (qv) (qw) (qx) (qy) (qz) (ra) (rb) (rc) (rd) (re) (rf) (rg) (rh) (ri) (rj) (rk) (rl) (rm) (rn) (ro) (rp) (rq) (rr) (rs) (rt) (ru) (rv) (rw) (rx) (ry) (rz) (sa) (sb) (sc) (sd) (se) (sf) (sg) (sh) (si) (sj) (sk) (sl) (sm) (sn) (so) (sp) (sq) (sr) (ss) (st) (su) (sv) (sw) (sx) (sy) (sz) (ta) (tb) (tc) (td) (te) (tf) (tg) (th) (ti) (tj) (tk) (tl) (tm) (tn) (to) (tp) (tq) (tr) (ts) (tt) (tu) (tv) (tw) (tx) (ty) (tz) (ua) (ub) (uc) (ud) (ue) (uf) (ug) (uh) (ui) (uj) (uk) (ul) (um) (un) (uo) (up) (uq) (ur) (us) (ut) (uu) (uv) (uw) (ux) (uy) (uz) (va) (vb) (vc) (vd) (ve) (vf) (vg) (vh) (vi) (vj) (vk) (vl) (vm) (vn) (vo) (vp) (vq) (vr) (vs) (vt) (vu) (vv) (vw) (vx) (vy) (vz) (wa) (wb) (wc) (wd) (we) (wf) (wg) (wh) (wi) (wj) (wk) (wl) (wm) (wn) (wo) (wp) (wq) (wr) (ws) (wt) (wu) (wv) (ww) (wx) (wy) (wz) (xa) (xb) (xc) (xd) (xe) (xf) (xg) (xh) (xi) (xj) (xk) (xl) (xm) (xn) (xo) (xp) (xq) (xr) (xs) (xt) (xu) (xv) (xw) (xx) (xy) (xz) (ya) (yb) (yc) (yd) (ye) (yf) (yg) (yh) (yi) (yj) (yk) (yl) (ym) (yn) (yo) (yp) (yq) (yr) (ys) (yt) (yu) (yv) (yw) (yx) (yy) (yz) (za) (zb) (zc) (zd) (ze) (zf) (zg) (zh) (zi) (zj) (zk) (zl) (zm) (zn) (zo) (zp) (zq) (zr) (zs) (zt) (zu) (zv) (zw) (zx) (zy) (zz)
England and Wales.....	22	19	5	.....	.....	.....	
Scotland.....	2	1	.....	.....	.....	.....
Ireland.....	127	96	89	(b) (c) (d) (e) (f) (g) (h) (i) (j) (k) (l) (m) (n) (o) (p) (q) (r) (s) (t) (u) (v) (w) (x) (y) (z) (aa) (ab) (ac) (ad) (ae) (af) (ag) (ah) (ai) (aj) (ak) (al) (am) (an) (ao) (ap) (aq) (ar) (as) (at) (au) (av) (aw) (ax) (ay) (az) (ba) (bb) (bc) (bd) (be) (bf) (bg) (bh) (bi) (bj) (bk) (bl) (bm) (bn) (bo) (bp) (bq) (br) (bs) (bt) (bu) (bv) (bw) (bx) (by) (bz) (ca) (cb) (cc) (cd) (ce) (cf) (cg) (ch) (ci) (cj) (ck) (cl) (cm) (cn) (co) (cp) (cq) (cr) (cs) (ct) (cu) (cv) (cw) (cx) (cy) (cz) (da) (db) (dc) (dd) (de) (df) (dg) (dh) (di) (dj) (dk) (dl) (dm) (dn) (do) (dp) (dq) (dr) (ds) (dt) (du) (dv) (dw) (dx) (dy) (dz) (ea) (eb) (ec) (ed) (ee) (ef) (eg) (eh) (ei) (ej) (ek) (el) (em) (en) (eo) (ep) (eq) (er) (es) (et) (eu) (ev) (ew) (ex) (ey) (ez) (fa) (fb) (fc) (fd) (fe) (ff) (fg) (fh) (fi) (fj) (fk) (fl) (fm) (fn) (fo) (fp) (fq) (fr) (fs) (ft) (fu) (fv) (fw) (fx) (fy) (fz) (ga) (gb) (gc) (gd) (ge) (gf) (gg) (gh) (gi) (gj) (gk) (gl) (gm) (gn) (go) (gp) (gq) (gr) (gs) (gt) (gu) (gv) (gw) (gx) (gy) (gz) (ha) (hb) (hc) (hd) (he) (hf) (hg) (hh) (hi) (hj) (hk) (hl) (hm) (hn) (ho) (hp) (hq) (hr) (hs) (ht) (hu) (hv) (hw) (hx) (hy) (hz) (ia) (ib) (ic) (id) (ie) (if) (ig) (ih) (ii) (ij) (ik) (il) (im) (in) (io) (ip) (iq) (ir) (is) (it) (iu) (iv) (iw) (ix) (iy) (iz) (ja) (jb) (jc) (jd) (je) (jf) (jg) (jh) (ji) (jj) (jk) (jl) (jm) (jn) (jo) (jp) (jq) (jr) (js) (jt) (ju) (jv) (jw) (jx) (jy) (jz) (ka) (kb) (kc) (kd) (ke) (kf) (kg) (kh) (ki) (kj) (kl) (km) (kn) (ko) (kp) (kq) (kr) (ks) (kt) (ku) (kv) (kw) (kx) (ky) (kz) (la) (lb) (lc) (ld) (le) (lf) (lg) (lh) (li) (lj) (lk) (lm) (ln) (lo) (lp) (lq) (lr) (ls) (lt) (lu) (lv) (lw) (lx) (ly) (lz) (ma) (mb) (mc) (md) (me) (mf) (mg) (mh) (mi) (mj) (mk) (ml) (mn) (mo) (mp) (mq) (mr) (ms) (mt) (mu) (mv) (mw) (mx) (my) (mz) (na) (nb) (nc) (nd) (ne) (nf) (ng) (nh) (ni) (nj) (nk) (nl) (nm) (nn) (no) (np) (nq) (nr) (ns) (nt) (nu) (nv) (nw) (nx) (ny) (nz) (oa) (ob) (oc) (od) (oe) (of) (og) (oh) (oi) (oj) (ok) (ol) (om) (on) (oo) (op) (oq) (or) (os) (ot) (ou) (ov) (ow) (ox) (oy) (oz) (pa) (pb) (pc) (pd) (pe) (pf) (pg) (ph) (pi) (pj) (pk) (pl) (pm) (pn) (po) (pp) (pq) (pr) (ps) (pt) (pu) (pv) (pw) (px) (py) (pz) (qa) (qb) (qc) (qd) (qe) (qf) (qg) (qh) (qi) (qj) (qk) (ql) (qm) (qn) (qo) (qp) (qq) (qr) (qs) (qt) (qu) (qv) (qw) (qx) (qy) (qz) (ra) (rb) (rc) (rd) (re) (rf) (rg) (rh) (ri) (rj) (rk) (rl) (rm) (rn) (ro) (rp) (rq) (rr) (rs) (rt) (ru) (rv) (rw) (rx) (ry) (rz) (sa) (sb) (sc) (sd) (se) (sf) (sg) (sh) (si) (sj) (sk) (sl) (sm) (sn) (so) (sp) (sq) (sr) (ss) (st) (su) (sv) (sw) (sx) (sy) (sz) (ta) (tb) (tc) (td) (te) (tf) (tg) (th) (ti) (tj) (tk) (tl) (tm) (tn) (to) (tp) (tq) (tr) (ts) (tt) (tu) (tv) (tw) (tx) (ty) (tz) (ua) (ub) (uc) (ud) (ue) (uf) (ug) (uh) (ui) (uj) (uk) (ul) (um) (un) (uo) (up) (uq) (ur) (us) (ut) (uu) (uv) (uw) (ux) (uy) (uz) (va) (vb) (vc) (vd) (ve) (vf) (vg) (vh) (vi) (vj) (vk) (vl) (vm) (vn) (vo) (vp) (vq) (vr) (vs) (vt) (vu) (vv) (vw) (vx) (vy) (vz) (wa) (wb) (wc) (wd) (we) (wf) (wg) (wh) (wi) (wj) (wk) (wl) (wm) (wn) (wo) (wp) (wq) (wr) (ws) (wt) (wu) (wv) (ww) (wx) (wy) (wz) (xa) (xb) (xc) (xd) (xe) (xf) (xg) (xh) (xi) (xj) (xk) (xl) (xm) (xn) (xo) (xp) (xq) (xr) (xs) (xt) (xu) (xv) (xw) (xx) (xy) (xz) (ya) (yb) (yc) (yd) (ye) (yf) (yg) (yh) (yi) (yj) (yk) (yl) (ym) (yn) (yo) (yp) (yq) (yr) (ys) (yt) (yu) (yv) (yw) (yx) (yy) (yz) (za) (zb) (zc) (zd) (ze) (zf) (zg) (zh) (zi) (zj) (zk) (zl) (zm) (zn) (zo) (zp) (zq) (zr) (zs) (zt) (zu) (zv) (zw) (zx) (zy) (zz)
Netherlands.....	53	24	43	(a) (b) (c) (d) (e) (f) (g) (h) (i) (j) (k) (l) (m) (n) (o) (p) (q) (r) (s) (t) (u) (v) (w) (x) (y) (z) (aa) (ab) (ac) (ad) (ae) (af) (ag) (ah) (ai) (aj) (ak) (al) (am) (an) (ao) (ap) (aq) (ar) (as) (at) (au) (av) (aw) (ax) (ay) (az) (ba) (bb) (bc) (bd) (be) (bf) (bg) (bh) (bi) (bj) (bk) (bl) (bm) (bn) (bo) (bp) (bq) (br) (bs) (bt) (bu) (bv) (bw) (bx) (by) (bz) (ca) (cb) (cc) (cd) (ce) (cf) (cg) (ch) (ci) (cj) (ck) (cl) (cm) (cn) (co) (cp) (cq) (cr) (cs) (ct) (cu) (cv) (cw) (cx) (cy) (cz) (da) (db) (dc) (dd) (de) (df) (dg) (dh) (di) (dj) (dk) (dl) (dm) (dn) (do) (dp) (dq) (dr) (ds) (dt) (du) (dv) (dw) (dx) (dy) (dz) (ea) (eb) (ec) (ed) (ee) (ef) (eg) (eh) (ei) (ej) (ek) (el) (em) (en) (eo) (ep) (eq) (er) (es) (et) (eu) (ev) (ew) (ex) (ey) (ez) (fa) (fb) (fc) (fd) (fe) (ff) (fg) (fh) (fi) (fj) (fk) (fl) (fm) (fn) (fo) (fp) (fq) (fr) (fs) (ft) (fu) (fv) (fw) (fx) (fy) (fz) (ga) (gb) (gc) (gd) (ge) (gf) (gg) (gh) (gi) (gj) (gk) (gl) (gm) (gn) (go) (gp) (gq) (gr) (gs) (gt) (gu) (gv) (gw) (gx) (gy) (gz) (ha) (hb) (hc) (hd) (he) (hf) (hg) (hh) (hi) (hj) (hk) (hl) (hm) (hn) (ho) (hp) (hq) (hr) (hs) (ht) (hu) (hv) (hw) (hx) (hy) (hz) (ia) (ib) (ic) (id) (ie) (if) (ig) (ih) (ii) (ij) (ik) (il) (im) (in) (io) (ip) (iq) (ir) (is) (it) (iu) (iv) (iw) (ix) (iy) (iz) (ja) (jb) (jc) (jd) (je) (jf) (jg)						

THE AGRICULTURAL GAZETTE OF CANADA

POTATOES

Table 8

Countries	Area Thousands of acres			Production Thousands of bushels		
	1920	1919	Average 1914-18	1920	1919	Average 1914-18
Germany.....	6,054	5,387	7,291	.....	788,123	1,367,993
Belgium.....	331	319	.....	57,095	76,065	.....
Bulgaria.....	15	.....	.....	2,023	.....	.....
Denmark.....	216	226	160	.....	53,087	34,283
Spain.....	1,166	805	731	104,762	101,020	99,903
Jugo-Slavia.....	349	.....	.....	38,452	.....	.....
Finland.....	208	204	201	17,865	17,718	17,723
France.....	3,332	3,104	3,298	.....	284,049	346,123
England and Wales.....	545	475	499	117,115	102,032	118,457
Scotland.....	162	155	149	46,181	31,061	36,151
Ireland.....	584	589	635	74,141	102,539	131,452
Hungary.....	622	.....	.....	71,569	.....	.....
Italy.....	741	763	730	51,441	50,989	54,414
Norway.....	132	132	122	30,811	37,912	28,425
Netherlands.....	421	445	431	91,304	105,317	102,164
Roumania.....	35	70	79	.....	2,832	3,429
Bessarabia.....	36	39	45	3,226	2,916	3,984
Bukovina.....	47	71	.....	.....	5,096	.....
Transylvania.....	130	.....	.....	.....	.....	.....
Sweden.....	366	417	385	60,260	77,574	66,951
Switzerland.....	123	136	132	28,256	27,925	28,219
Czecho-Slovakia.....	1,512	.....	.....	.....	.....	.....
Canada.....	785	819	565	133,831	125,575	78,712
United States.....	3,929	3,952	3,938	430,458	357,907	382,113
Guatemala.....	2	6	.....	96	694	.....
Japan.....	334	344	261	47,278	67,236	39,656
Algeria.....	43	44	.....	985	.....	.....
Tunis.....	3	2	1	.....	138	117

SUGAR BEETS

Table 9

Countries	Area Thousands of acres			Production (Thousands of tons (2,000 lb.))		
	1920	1919	Average 1914-18	1920	1919	Average 1914-18
Germany.....	811	744	1,008	.....	6,413	11,685
Belgium.....	124	112	.....	1,774	793	.....
Bulgaria.....	16	.....	.....	133	.....	.....
Denmark.....	95	102	80	.....	1,120	960
Spain.....	184	133	126	1,731	1,160	1,115
Finland.....	2	1	.....	11	9	.....
France.....	202	165	214	.....	1,194	2,204
England and Wales.....	3	1	1	.....	.....	.....
Hungary.....	82	.....	.....	675	.....	.....
Italy.....	124	106	114	1,653	1,651	1,408
Netherlands.....	157	131	133	2,281	1,647	1,792
Roumania.....	8	5	29	.....	31	168
Bessarabia.....	1	3	2	1	6	.....
Bukovina.....	.....	.....	.....	.....	1	.....
Transylvania.....	5	.....	.....	.....	.....	.....
Sweden.....	108	90	81	1,124	1,031	968
Switzerland.....	1	1	1	10	11	22
Czecho-Slovakia.....	523	.....	.....	.....	.....	.....
Canada.....	36	25	15	412	240	123
United States.....	882	692	604	8,545	6,421	6,051

THE AGRICULTURAL GAZETTE OF CANADA

Table 10

WORLD'S PRODUCTION OF WHEAT

Countries	1920	1919	Five years' pre-war average 1909-13
	Bushels	Bushels	Bushels
North America—			
Canada.....	263,189,000	193,260,000	197,118,000
United States.....	787,128,000	934,265,000	686,697,000
Mexico.....	10,000,000a	10,000,000	8,000,000
Guatemala.....	312,000	251,000	632,000
Total North America.....	1,060,629,000	1,137,776,000	892,447,000
South America—			
Argentina.....	184,000,000	214,142,000	148,908,000
Chili.....	14,000,000a	12,000,000	14,000,000
Uruguay.....	6,000,000a	5,416,000	6,519,000
Total South America.....	204,000,000	231,558,000	169,427,000
Australasia—			
Australia.....	149,000,000b	44,001,000	90,500,000
New Zealand.....	7,000,000a	4,005,000	7,070,000
Total Australasia.....	156,000,000	48,006,000	97,570,000
Africa—			
Algeria.....	8,929,000	19,166,000	34,998,000
Egypt.....	31,711,000	30,137,000	34,121,000
Tunis.....	4,766,000	6,981,000	6,230,000
South Africa.....	8,650,000	6,630,000	6,520,000
Total Africa.....	54,056,000	62,914,000	81,869,000
Asia—			
India.....	376,768,000	280,299,000	359,035,000
Japan.....	29,468,000	30,676,000	24,166,000
Korea.....	7,000,000	7,144,000	5,922,000
Persia.....	13,000,000a	13,000,000	13,600,000
Total Asia.....	426,236,000	331,119,000	402,723,000
Europe—			
Great Britain and Ireland.....	57,000,000c	69,324,000	59,640,000
France.....	230,406,000	182,446,000	317,639,000
Italy.....	141,338,000	169,771,000	183,336,000
Belgium.....	7,949,000	9,895,000	14,894,000
Netherlands.....	6,677,000	6,015,000	4,896,000
Denmark.....	6,945,000	5,923,000	5,344,000
Norway.....	1,035,000	1,071,000	306,000
Sweden.....	11,123,000	9,509,000	8,103,000
Switzerland.....	3,586,000	3,524,000	3,314,000
Spain.....	134,457,000	129,251,000	130,447,000
Portugal.....	5,000,000a	6,400,000a	7,440,000
Greece.....	13,288,000	9,693,000	9,400,000d
Bulgaria.....	41,190,000	34,029,000	29,308,000d
Jugo-Slavia.....	64,712,000	50,956,000	.....
Roumania.....	24,000,000	48,492,000	57,896,000d
Bessarabia.....	17,815,000	16,988,000	18,569,000d
Czecho-Slovakia.....	24,436,000	15,051,000	23,541,000e
Germany.....	78,925,000	79,700,000	113,100,000d
Total Europe (less Jugo-Slavia).....	805,170,000	797,082,000	987,173,000
World's Total.....	2,706,091,000	2,608,455,000	2,631,209,000

(a) Estimates based on condition reports.

(b) Broomhall's estimate.

(c) Official for England and Wales, and Ireland, estimated for Scotland.

(d) Average 1914-18.

(e) Year 1914.

WHEAT AND FLOUR

Exports of Exporting Countries During the Grain Years August 1st to July 31st.
(Calendar Years for Argentina and Australia.)

Table 12.

Countries	Average 5 years 1908-09 to 1912-13	1913-14	1914-15	1915-16	1916-17	1917-18	1918-19	1919-20
	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels
Canada.....	80,058,000	135,589,000	86,756,000	269,162,000	174,409,000	169,242,000	103,613,000	92,499,000
United States.....	99,620,000	162,800,000	313,861,000	242,020,000	201,423,000	135,324,000	289,909,000	240,647,000
India.....	48,860,000	33,475,000	37,202,000	8,604,000	56,222,000	39,882,000	.....	.....
Algeria.....	5,510,000	5,671,000	4,762,000	5,744,000	3,877,000	2,060,000	.....	.....
Russia.....	151,787,000	170,122,000	7,585,000	13,782,000	7,552,000	.....	.....	.....
Roumania.....	51,566,000	51,855,000	4,007,000	22,632,000	.....	.....	.....	.....
Argentina.....	1909-13	1914	1915	1916	1917	1918	1919	1920
Australia.....	95,716,000	38,984,000	94,967,000	86,038,000	37,829,000	115,110,000	127,142,000	184,600,000
	49,673,000	60,878,000	1,806,000	56,037,000	63,231,000	38,972,000	109,537,000	49,132,000

In the above table figures for calendar years, which do not coincide with our grain years, were given for the Southern countries. In the grain year 1918-19 Argentina exported 83,000,000 bushels and Australia 73,000,000 bushels. In 1919-20 Argentina exported 265,000,000 bushels and Australia 99,000,000.

THE AGRICULTURAL GAZETTE OF CANADA

Table 13 MONTHLY EXPORTS OF WHEAT AND FLOUR FROM CANADA AND THE UNITED STATES

Months	Canada	United States
	Bushels	Bushels
1919-20		
August.....	9,562,000	20,310,000
September.....	4,247,000	24,816,000
October.....	6,454,000	20,979,000
November.....	12,138,000	23,396,000
December.....	13,205,000	15,427,000
January.....	12,299,000	12,271,000
February.....	7,615,000	10,581,000
March.....	5,915,000	16,881,000
April.....	2,493,000	13,722,000
May.....	2,755,000	25,885,000
June.....	7,950,000	21,754,000
July.....	7,878,000	34,655,000
Total for grain year.....	92,511,000	240,677,000
1920-21		
August.....	6,065,000	32,550,000
September.....	5,321,000	34,994,000
October.....	19,114,000	43,033,000
November.....	29,483,000	30,989,000
December.....	37,468,000	40,179,000
January.....	14,612,000	27,105,000

EXPORTS OF WHEAT AND FLOUR FROM CANADA DURING GRAIN YEARS ENDING JULY 31

(Flour expressed in equivalent quantities of wheat)

Table 14

Year	Bushels
1898-99 (a).....	13,872,000
1903-04 (a).....	30,031,000
1908-09.....	56,735,000
1913-14.....	135,589,000
1914-15.....	86,756,000
1915-16.....	269,162,000
1916-17.....	174,565,000
1917-18.....	169,040,000
1918-19.....	103,611,000
1919-20.....	92,511,000

(a) Year ending June 30.

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Table 15. IMPORTS OF WHEAT AND FLOUR—THOUSANDS OF BUSHELS

Months	Great Britain and Ireland			France			Italy			Belgium		
	Wheat	Flour	Total	Wheat	Flour	Total	Wheat	Flour	Total	Wheat	Flour	Total
Total 1919-20, August 1st to July 31st	179,270	33,382	212,552	73,807	14,978	88,785	78,495	7,559	85,945	21,092	1,395	22,488
1920-21.												
August.....	22,325	3,382	25,707	11,630	620	12,250	6,199	24	6,223	4,584	26	4,610
September.....	27,152	2,625	29,777	8,280	5	8,285	8,386	536	8,922	1,601	18	1,616
October.....	21,387	2,805	24,192				5,485	15	5,500	1,433	7	1,440

THE AGRICULTURAL GAZETTE OF CANADA

WHEAT AND FLOUR.

Broomhall's Estimates of Requirements of
Importing Countries for Current
Season.
(February 1, 1921)

"The general international statistical position of wheat has undergone no alteration

in the past week, and remains favourable for buyers. The shipments to Europe for the first half of the season totals 252,000,000 bushels, and to, ex-Europe 20,000,000 bushels (these quantities include estimated Manchurian shipments), the grand total being 272,000,000 bushels."

Table 16

Countries	Season 1920-21 Aug. 1 to July 31	Still required Feb. 1 to July 31
	Bushels	Bushels
United Kingdom.....	208,000,000	92,000,000
France.....	64,000,000	32,000,000
Italy.....	80,000,000	40,000,000
Spain.....	16,000,000	4,000,000
Portugal.....	4,000,000	2,400,000
Greece.....	8,000,000	4,000,000
Belgium.....	48,000,000	24,000,000
Germany.....	48,000,000	24,000,000
Holland, Switzerland, Norway, Sweden and Denmark.....	32,000,000	24,000,000
Austria, Czecho-Slovakia and Poland.....	16,000,000	8,000,000
Total Europe.....	524,000,000	254,400,000
Ex Europe.....	48,000,000	28,000,000
Grand Total.....	572,000,000	282,400,000

With reference to the above estimates we wish to point out that both the United Kingdom and France have already imported freely, partly from floating supplies, but we have reckoned a full quantity for the latter country for the ensuing six months, because it was recently announced that purchases of 72,000,000 bushels of wheat and rye for this season had been authorized, and we are inclined to think that some of the imports declared for last August were really imported in the previous season. The Italian consumption in the four months, August-November, was very light, but we think the basis is too narrow to warrant the assumption that the season's total will be correspondingly reduced. There are some indications that Austria, Poland and Czecho-Slovakia may take larger quantities in the near future, but it is evident that the supply problem for these countries is a very difficult one."

So much for Mr. Broomhall's estimates of the world's requirements and his comments thereon. The figures for European countries coincide with those estimated in our article in the "Agricultural Gazette" for August,

1920 (p. 721). We now think that the estimate made at that time of 70,000,000 bushels for requirements outside of Europe is more probably correct than Mr. Broomhall's estimate of 48,000,000. Broomhall's pre-war estimate of requirements outside of Europe was generally from 90 to 98 million bushels. In the current year, of these total outside estimated needs of 70,000,000 bushels, Brazil will probably take 25,000,000 bushels from Argentina, and the Mediterranean countries, not mentioned in Mr. Broomhall's statement and whose crop suffered from drought last season, together with the armies operating close to the Mediterranean, will probably take an additional 20,000,000 bushels. A large number of other small tropical States that do not furnish official reports of their imports will, we believe, account for the additional 25,000,000 bushels. It is not, therefore, improbable that the world's requirements will be about 594,000,000 bushels or even 600,000,000 bushels. Against these requirements there will be available some 605,000,000 bushels. The details of the supply situation are estimated in the next table:—

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Table 17

	Carry-over August 1, 1920	Production 1920	Home Needs	Probable Export	Carry-over August 1, 1921
	Thousand Bushels	Thousand Bushels	Thousand Bushels	Thousand Bushels	Thousand Bushels
Canada.....	10,000	263,189	93,000	170,000	10,000
United States.....	124,000	787,128	625,000	240,000	46,000
Argentina.....	17,963	184,000*	82,000	90,000	30,000
Australia.....	16,000	149,000*	55,000	90,000	20,000
India.....	6,000	376,768	330,000	15,000	37,000
	173,963	1,760,085	1,185,000	605,000	143,000

* 1920-21.

Argentina and Australia are not likely to export anywhere near their total available surpluses during the seven months from harvest to August 1 next. Their carry-over will no doubt be considerable, and this carry-over will come into competition with the North American crop. In the case of India a very large proportion of the surplus is likely to be retained at home to compensate for the under-average crop expected in March and April next from an area four million acres smaller than in 1920. The estimated data in the table are of value only inasmuch as they indicate what adjustment may occur as between demand and supply if some unexpected factors do not appear. Among these factors will be the possibility of trade relations being concluded with the Russian Government, also the possibility of moderate exports from the Ukraine and Balkan States. If these factors be excluded the present supplies of wheat do not appear so excessive as to justify the recent very severe decline in prices. The adverse exchange and the lengthening of the milling extraction of wheat to 80% in the European countries are unfavourable factors, but any indication of serious impairment of the winter crops, say, of the United States crop, would quickly reverse the downward tendency. Last year's world's crop was coincidentally large in a number of the chief exporting countries. The average was exceeded notably in India, Australia, and even Argentina, not to mention North America.

It is encouraging to bear in mind a statement in the last issue of the "Gazette" (p. 99) as to the increased world's tonnage now available, namely 60,000,000 tons, as compared with 45,000,000 tons before the war, also the recent report that a large portion of that tonnage is idle. Lower freights will mean a larger share of the selling price to be divided between the producer and the consumer.

The world's acreage in wheat as compared with the pre-war average does not show a striking difference. In the "Gazette" of

August, 1919 (p. 776) the comparative acreages were given. Excluding Russia the totals for 1919 were 201 million acres against 186 million pre-war, an increase of 15 million. But the decrease of acreage in the United States in 1920 (57 million compared with 72 million in 1919) was only a little less than that decrease. From our present table No. 1 there appear decreases for France, Hungary, Roumania, Germany, Bulgaria and Italy of about 11 million acres, as compared with the pre-war average. On the other hand Canada exhibits an increase of 8,287,000, and the United States of 10,095,000. Then the United States, as we have just said, had 15 million acres less than in 1919. There may be evidence here that patriotism and high prices have stimulated too great a specialization in wheat as compared with other agricultural enterprises.

It is noticeable, from Tables No. 1-4 that Germany's acreage as well as production has decreased for all crops. The data for 1919 and 1920 are for practical purposes comparable with the average of 1914-18, although the latter may comprise the relatively unimportant figures for that part of Silesia which has gone to Poland. The data for Alsace and Lorraine are excluded in both cases. The decreases shown for the acreage and production of rye and potatoes is striking, and would indicate a present shortage of the foods upon which the people chiefly relied before and during the war.

On the other hand France is rapidly regaining her former position in area and production of all crops. She has already exceeded her 1914-18 average in area and production of oats, flaxseed and fibre and potatoes. Great Britain and Ireland has lost some in wheat and rye, but has gained in all the other products. Italy has maintained her acreage very well, although she has suffered some in production especially of wheat. Canada shows up well in the increase of all crops. Canada has made notable progress in wheat, and has, for the same two periods, increased her acreage in rye from 230,000 to 650,000; in oats from 12,150,000 to 15,850,000

THE AGRICULTURAL GAZETTE OF CANADA

in flaxseed from 838,000 to 1,428,000; in potatoes from 565,000 to 785,000; in sugar-beets from 15,000 to 36,000. The increases would be much more striking if the comparison were made between 1920 and the pre-war five-year average.

In the world's production of wheat by continents, excluding Russia, shown in Table No. 10, the grand total for 1920 is 74,882,000 in excess of that for the pre-war average, and 97,636,000 in excess of that for 1919. That increase is accounted for nearly altogether by the Indian crop of 1920, which was nearly 100,000,000 above that of 1919. However, the light acreage and drought of the current season in India compels withholding most of the surplus from the market, so that for practical purposes it may be assumed that the world's production of 1920 was about equal to that of the preceding year and equal to the pre-war five-year average. That average was fairly high because 1912 and 1913 were years of abundant production, although the big surpluses of the 1913 crop were readily absorbed during the first year of the war.

In the totals of production by continents in Table No. 10, for the same periods, it may be noticed that while in 1920 Europe's total is 182 million bushels below pre-war average North America's is 168 million above it. South America, Australia and Asia all show comparative increases of more or less importance.

With reference to Tables Nos. 12, 13 and 14 it is to be observed that our production, on an increased acreage in the last couple of years preceding the current one, has not enabled Canada to export an amount of wheat much in excess of our average exports during the pre-war period, while the United States has exported two and a half times as much. Climatic conditions favoured the United States but reduction of their acreage which, for the winter crop sown last fall, amounted to 1,152,000 acres, might with lower prices extend to the spring-sown wheat. Should unfavourable climatic conditions develop later the result might leave but little for export. The world's situation and the tendency towards reduction of acreage in the United States would scarcely justify a great reduction in Canada's acreage, although the world's live-stock situation, shown in Table No. 18, indicates the general strength of this situation and offers a strong argument for mixed farming.

The monthly export figures (Table 13) show in the first five months of the current year that the United States have rushed a great deal of wheat to market in a short time. If the official figures of carry-over from the old crop and the production of 1920 are correct their exports cannot continue at anything like the same rate. From data so

far to hand it appears that Canada has, apart from shipments in bond through United States ports, exported to the United States 20 million bushels in the months of September, October and November. The bulk of this lost its identity and was no doubt shipped out in the form of wheat or flour by the United States and credited on their domestic wheat exports. This is a species of duplication which does not occur in Canada.

Table 15—imports of wheat and flour by European countries—gives results only for the first three months of the current grain year. But it is noticeable that Britain's average monthly import is over 25,000,000 bushels. This fact is a pretty forceful commentary on a statement recently made by Mr. Julius H. Barnes, former United States Wheat Director and President of the United States Grain Corporation. In Chicago on November 5 last, before a committee of seventeen representing farmers' organizations appointed to consider grain marketing problems, Mr. Barnes spoke as follows:

"For instance, the largest overseas buyer, whose normal requirements run to practically one-half the overseas purchases of wheat, has bought not a bushel in America since July 29—over three months ago—their policy directed by Governmental consideration which would not have affected the usual import merchants abroad. They have abstained from purchasing during the period of crop pressure here and in Canada. Fortunately there has not been concerted action among all the Governments, and other importing countries have continued current purchases to a large amount. This particular importer has been able so to abstain because of large purchases made in America last May, June and July, providing an enormous advance stock, which has carried them through these months and may for some time longer. This is a total deflection of the operation of supply and demand as usually interpreted by commercial judgment. The merchant opinion of the world, freely operating, would never have dared accumulate such a supply of high-priced wheat and there would never have been thus established the price level recorded last May and June, for nothing in the usual factors of supply and demand justified such urgent purchasing."

That is indeed an interesting statement, but it is well to mention that not only did Britain's imports for August, September and October amount to over 79 million bushels, but during May, June and July they were only 58 million, being respectively 14, 20 and 24 million bushels.

Our information is that during April, May, June and July the Government Commissions

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not only of Great Britain but of the leading European countries entered into aggressive competition for American supplies, and drove prices to a scarcity level, so that the prices at New York during these months ranged over \$3.00 a bushel. The outside world took from North America in the six months July-December last more wheat and flour than in any other corresponding period, namely 311,729,000 bushels, of which 206,400,000 was American and 105,329,000 Canadian. No doubt the buying which Mr. Barnes refers to was contracts for future delivery. Of the American wheat some 40,000,000 bushels probably represented imported Canadian wheat, which was subsequently exported on American account, so the total of 311 million may be to that extent excessive.

There have been recently published illuminating articles on the wheat situation, both domestic and foreign, in the leading agricultural press. Two Canadian contributions are particularly creditable and useful. They are: "Statistical and Commentary Review of the Live Stock Market and Trade Situation during 1920", issued in mimeograph form by the Dominion Live Stock Branch of the Department of Agriculture, and two articles published in the Winnipeg Grain Trade News and Live Stock Journal of February 3 and 11 by Mr. W. Sanford Evans, entitled, respectively, "Wheat Prices Compared with General Prices" and "Effect on Wheat Prices of Quantity Produced", both illustrated by excellent charts. To those desirous of making a serious study of actual condition we cannot too strongly recommend a careful perusal of such well considered and ably presented statements.

THE WORLD'S LIVE STOCK.

CATTLE

Table 18.

Countries.	Recent estimates			Before the war		Difference between pre-war and latest estimates	
	Date	Number	Date	Date	Number	Increase	Decrease
Great Britain.....	June, 1920	6,711,209	1919	June, 1914	7,132,860	.....	421,651
Ireland.....	June, 1920	5,019,837	1919	June, 1914	5,051,645	.....	31,808
France.....	June, 1920	5,019,837	Dec.	Dec. 1913	14,787,710	.....	2,414,050
Italy.....	June, 1920	.....	Dec.	Dec. 1914	6,640,000	.....	400,259
Spain.....	June, 1920	.....	Dec.	Dec. 1913	2,878,856	354,344	.....
Norway.....	June, 1920	.....	Dec.	Dec. 1914	1,146,274	.....	108,457
Sweden.....	June, 1920	.....	June	Sept. 1913	2,722,646	.....	171,818
Denmark.....	July, 1920	2,286,408	June	Dec. 1913	2,462,862	.....	176,454
Netherlands.....	July, 1920	.....	July	June, 1913	2,096,599	.....	127,990
Belgium.....	Sept. 1920	1,292,271	March	Dec. 1913	1,849,484	.....	557,213
Switzerland.....	Sept. 1920	16,904,376	April	April, 1913	1,443,483	.....	10,313
Germany.....	March, 1920	16,740,693	Sept.	Dec. 1913	20,994,344	.....	4,089,968
Portugal.....	.....	.....	May	Oct. 1906	703,198	37,495	.....
Czecho-Slovakia.....	.....	.....	May, 1919	1910	3,288,291	.....	928,860
Totals.....	.....	(a)64,151,250	.....	.....	73,198,252	.....	.....
Total decrease.....	.....	9,047,022	or 12.4%	.....	.....	.....	.....
Canada.....	June, 1920	9,477,380	1919	June, 1914	6,036,817	3,440,563	.....
United States.....	Jan. 1920	66,191,000	1920	Jan. 1914	56,592,000	9,599,000	.....
Argentina.....	1920	27,392,126	.....	June, 1914	25,866,763	1,525,363	.....
Australia.....	.....	.....	Dec.	Dec. 1913	11,483,882	1,254,970	.....
New Zealand.....	Jan. 1920	3,059,445	Jan.	April, 1911	2,020,171	1,039,274	.....
South Africa.....	.....	.....	1919	1911	5,796,949	.....	221,461
Tunis.....	.....	.....	Feb.	Dec. 1913	217,304	417,519	.....
Totals.....	.....	(a)125,069,114	.....	.....	108,013,886	.....	.....
Total increase.....	.....	17,055,228	or 15.6%	.....	.....	.....	.....
Increase for all countries.....	.....	8,008,206	or 4.3%	.....	.....	.....	.....

(a) Includes figures for latest date where 1920 figures are not available.

SHEEP.

Table 19.

Countries	Recent estimates			Before the war		Difference between pre-war and latest estimates	
	Date	Number	Date	Number	Date	Increase	Decrease
Great Britain.....	June, 1920	19,724,779	June, 1919	21,534,349	June, 1914	24,363,396	4,638,617
Ireland.....	June, 1920	3,588,892	June, 1919	3,513,345	June, 1914	3,600,581	11,689
France.....	June, 1920	3,588,892	Dec. 1919	8,990,990	Dec. 1913	16,131,390	7,140,400
Italy.....	April, 1920	11,753,910	Dec. 1918	17,227,019	Dec. 1914	13,824,000	2,070,090
Spain.....	Dec. 1917	1,184,813	Dec. 1917	1,184,813	Dec. 1914	16,441,407	785,612
Norway.....	June, 1919	504,241	June, 1919	1,563,654	Sept. 1914	1,326,850	142,037
Sweden.....	July, 1920	126,502	July, 1919	599,466	Dec. 1913	972,394	591,260
Denmark.....	July, 1920	126,502	March, 1919	437,075	July, 1914	514,908	10,667
Netherlands.....	Sept. 1920	6,629,813	April, 1919	112,112	June, 1913	842,018	404,943
Belgium.....	Sept. 1920	3,850,733	April, 1919	265,414	Dec. 1910	185,373	59,171
Switzerland.....	March, 1920	76,017,967	May, 1919	170,432	April, 1911	161,414	104,000
Germany.....	March, 1920	11,128,452	May, 1919	170,432	Dec. 1913	5,520,837	1,108,976
Portugal.....	March, 1920	76,017,967	May, 1919	170,432	Oct. 1906	3,072,988	777,745
Czecho-Slovakia.....	March, 1920	11,128,452	May, 1919	170,432	1910	188,863	18,431
Totals.....	June, 1920	3,720,783	June, 1919	3,421,958	June, 1914	2,058,045	1,662,738
Total decrease.....	Jan. 1920	45,309,419	Jan. 1920	47,114,000	Jan. 1914	49,719,000	4,652,000
Canada.....	Jan. 1920	45,309,419	Dec. 1918	87,086,236	June, 1914	43,225,452	2,083,967
United States.....	Jan. 1920	23,914,506	Jan. 1919	25,828,554	Dec. 1913	85,057,402	2,028,894
Argentina.....	Jan. 1920	23,914,506	Jan. 1919	28,491,500	April, 1911	24,798,763	884,257
Australia.....	Jan. 1920	23,914,506	Feb. 1919	2,661,579	Dec. 1913	30,656,659	2,165,159
New Zealand.....	Jan. 1920	23,914,506	Feb. 1919	2,661,579	Dec. 1913	728,540	1,933,039
South Africa.....	Jan. 1920	23,914,506	Feb. 1919	2,661,579	Dec. 1913	728,540	1,933,039
Tunis.....	Jan. 1920	23,914,506	Feb. 1919	2,661,579	Dec. 1913	728,540	1,933,039
Totals.....	June, 1920	236,251,023	June, 1919	236,251,023	June, 1914	236,243,861	8,162
Total increase.....	Jan. 1920	8,162	Jan. 1920	8,162	Jan. 1914	8,162	8,162
Decrease for all countries.....	Jan. 1920	11,120,290	Jan. 1920	11,120,290	Jan. 1914	11,120,290	11,120,290

SWINE.

Table 20.

Countries	Recent estimates			Before the war			Difference between pre-war and latest estimates	
	Date	Number	Date	Number	Date	Number	Increase	Decrease
Great Britain.....	June, 1920	2,123,229	June, 1919	1,936,375	June, 1914	2,646,977	.....	523,748
Ireland.....	June, 1920	980,078	June, 1919	977,963	June, 1914	1,305,638	.....	325,560
France.....	.....	.....	Dec., 1919	4,080,560	Dec., 1913	7,035,850	.....	2,955,290
Italy.....	.....	.....	April, 1918	2,338,026	Dec., 1914	2,722,000	.....	383,074
Spain.....	.....	.....	Dec., 1917	3,929,449	Dec., 1913	2,710,185	.....	.....
Norway.....	.....	.....	June, 1918	209,286	Sept., 1914	228,117	.....	.....
Sweden.....	.....	.....	June, 1919	716,783	Dec., 1913	977,612	.....	18,831
Denmark.....	.....	.....	July, 1919	715,909	Dec., 1913	2,496,706	.....	260,829
Netherlands.....	July, 1920	1,007,861	March, 1919	449,829	June, 1914	1,350,204	.....	1,488,845
Belgium.....	.....	.....	.....	328,155	Dec., 1913	1,412,293	.....	900,375
Switzerland.....	.....	545,774	.....	465,306	April, 1911	570,226	.....	866,519
Germany.....	Sept., 1920	14,269,497	Sept., 1919	11,689,906	Dec., 1913	25,659,140	.....	104,920
Portugal.....	March, 1920	921,312	May, 1919	819,345	Oct., 1906	1,110,957	.....	11,389,643
Czecho-Slovakia.....	.....	.....	.....	.....	.....	1,790,746	.....	189,645
Totals.....	.....	32,857,235	.....	.....	.....	52,016,651	.....	971,401
Total decrease.....	.....	19,159,416	or 36.8%	.....	.....	.....	.....	.....
Canada.....	June, 1920	3,516,678	June, 1919	4,040,070	June, 1914	3,434,261	.....	.....
United States.....	Jan., 1921	66,649,000	Jan., 1920	71,727,000	Jan., 1914	58,933,600	82,417	.....
Argentina.....	.....	.....	.....	.....	.....	2,900,585	7,716,000	.....
Australia.....	.....	3,227,346	Dec., 1918	913,902	Dec., 1913	800,595	326,761	.....
New Zealand.....	.....	.....	Jan., 1919	235,347	April, 1911	348,734	113,397	.....
South Africa.....	Jan., 1920	259,647	Feb., 1919	724,007	.....	1,081,600	.....	89,107
Tunis.....	.....	.....	.....	17,681	Dec., 1913	.....	282	357,593
Totals.....	.....	75,308,261	.....	.....	.....	67,516,104	.....	.....
Total increase.....	7,792,157	or 11.5%
Decrease for all countries.....	11,367,259	or 9.6%

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The above tables contain the official estimates of the numbers of live stock in all the countries which have furnished figures to the International Institute. Since a number of countries have not yet reported for 1920 a second column has been added, under the heading "recent estimates", in order to give the estimates for the latest date possible. By giving these two columns, an idea of the trend of the live-stock situation during the past year may be obtained.

In Europe the numbers of live stock are still considerably less than before the war, especially in the case of swine. This shortage would be still more marked if figures were available for the Balkan and Central States of Europe. No inkling of the state of live stock in Russia has been received.

During the past year the numbers of live stock in Europe have not increased to any extent. In the United Kingdom there has been a decrease.

Cattle.—On the latest dates for which estimates are available the total number of cattle in the European countries mentioned was 64,151,000 compared with the pre-war total of 73,198,000, a decrease of 9,047,000. In the other countries, however, there were on the latest dates a total of 125,069,000

against 108,013,000 before the war, an increase of 17,055,000. The number of cattle for all the countries mentioned in the table has increased by 8,008,000 since the period before the war, which is not abnormal compared with the increase of population.

During the past year there have been decreases in the number of cattle in the United Kingdom, Canada and the United States.

Sheep.—In the European countries the total number of sheep decreased by 11,128,000 from 87,146,000 before the war to 76,018,000, the recent figures. In the other countries there was an increase of 8,000 from 236,243,000 to 236,251,000. There was a decrease between the two periods of 11,120,000, for all the countries. The number of sheep declined, during the past year, in the United Kingdom and the United States. There was a slight increase in Canada.

Swine.—Between the two periods the number of swine in the European countries decreased by 19,159,000, from 52,017,000 to 38,857,000. In the other countries there was an increase of 7,792,000 from 67,516,000 to 75,308,000. There was, therefore, a total decrease in all the countries given in the table, of 11,367,000. The number of swine decreased during the past year in Canada and the United States.

FOREIGN CROP CONDITIONS

United Kingdom.—The weather was very wet throughout January. On February 1 wheat was in good condition.

France.—At the end of January the new crops looked well, but growth was abnormally forward. Farmers were already preparing for spring sowing, and it is expected that a larger area will be put under crop.

Belgium.—Crops were looking well, and an increased area was planted to wheat.

Italy.—The wheat acreage is reported to be below average. The weather has not been favourable for the new crops.

Spain.—Conditions have been generally favourable, and crops present a good appearance.

Germany.—The condition of the crops was reported as satisfactory early in February. It is asserted that the pre-war outturns of grains cannot be expected while the shortage of fertilizers continues.

North Africa.—Crop prospects were reported as favourable early in February. The wheat acreage in Algeria is small owing to a shortage of seed.

India.—The area sown to wheat is estimated to be about 4,000,000 acres less than last year. Up to February 1 the weather had been very dry and wheat prospects unfavourable.

THE INTERNATIONAL INSTITUTE STATISTICAL BULLETIN (1)

(From the "Price Current-Grain Reporter," Feb. 23, 1921.)

Prof. Thomas H. Hunt of California, United States Delegate to the International Institute of Agriculture at Rome, under date of January 24, sends us the information that the first number of Part I of the "Monthly Bulletin of Statistics" of the Institute has appeared. This bulletin is unique in character. It is devoted entirely to comparative prices of agricultural products which are presented in an unusual form. For example, prices of wheat, rye, barley, oats, corn, rice and cotton in the principal markets of the chief exporting countries are given in terms commonly used in the country concerned. Taking a single instance, New York's quotation for No. 2 red winter wheat on Dec. 3 last is given as \$2.06 $\frac{3}{4}$ per bushel. As dollars mean little to a Frenchman, Italian or German, the Bulletin informs readers of those nationalities that the New York price of No. 2 red winter wheat on the date mentioned was 554.5 marks, 128.12 fr.; 214.38 lire per quintal of 3.67 bush. of 60 lbs. The requisition prices of several governments for domestic wheat also are given in such a manner that the Italian farmer may see that while New York price for hard winter was 214 lire, the price of his home-grown wheat was 117 lire and soft wheat 102 lire. Of special interest to the American farmer are

quotations side by side of No. 2 mixed corn at Chicago and yellow Plate corn at Buenos Aires, prepared in such a manner that the quotations may be readily understood by readers both in the United States and in Buenos Aires as well as in Europe.

The Bulletin gives also the cost of freights to various countries. Incidentally the Bulletin also publishes a graph showing the effect of removal of government control from ocean-going freights.

In addition to publishing 36 bulletins a year in five languages, each month a summary of the statistics of production is sent by wire or wireless to the United States and other countries. Prof. Hunt might have added, what we now know, that the Institute aims to make this service weekly in the near future and perhaps daily. So that Prof. Hunt is entirely justified in saying that the service that is being given by the Institute and will be given by it, as its organization for that purpose is perfected, is altogether a service that cannot be obtained elsewhere in the world and will be at the disposal of those who read any one of the English, French, German, Italian or Spanish languages, and the information will be couched in such terms as any intelligent person can understand.

(1) The Institute Statistical Bulletin in its new form is now being distributed by the Institute Branch, Department of Agriculture. Persons interested in it may have it on application, so long as the supply for distribution is not exhausted.—Editor's note.

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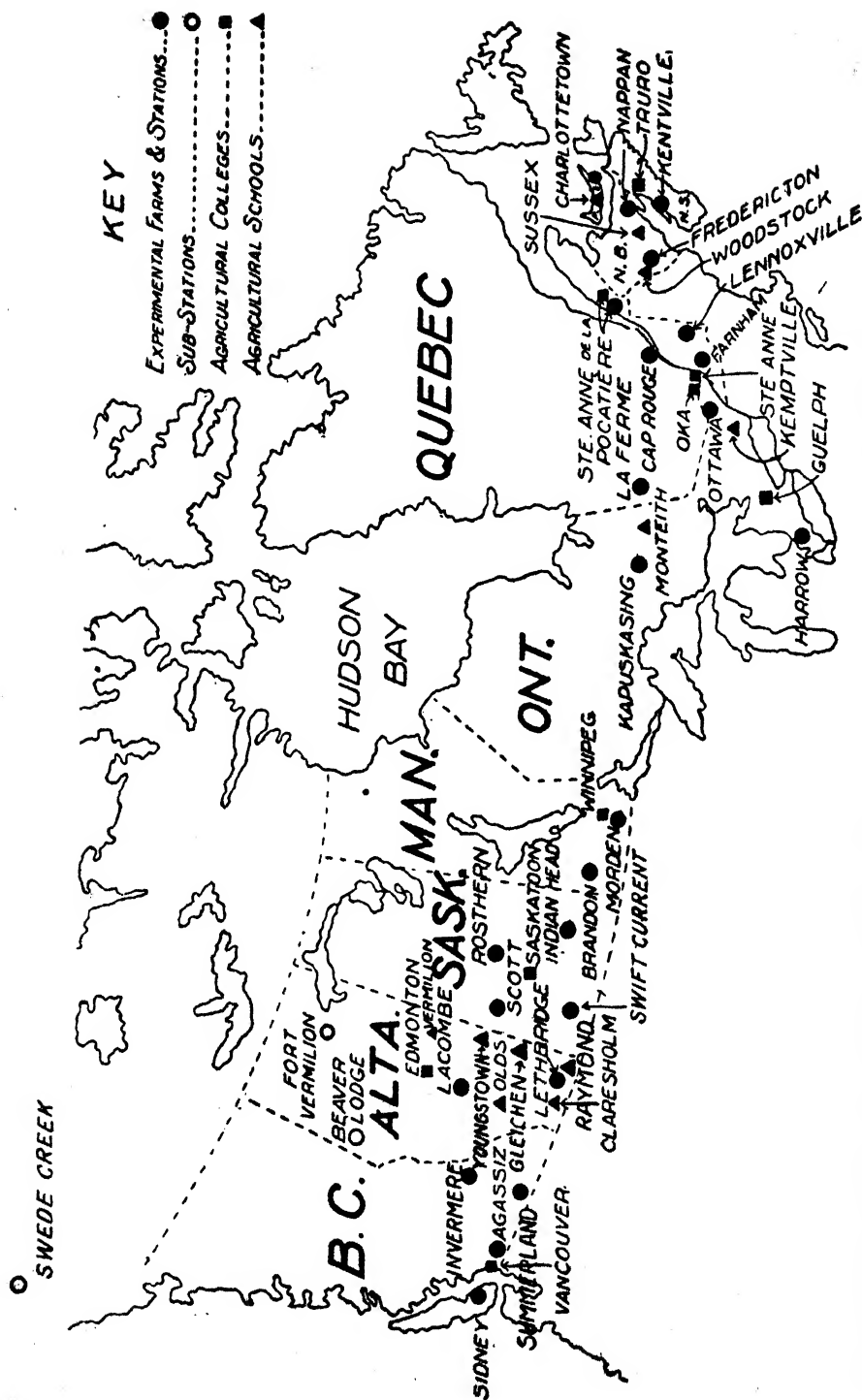
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OF CANADA

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MAP OF CANADA SHOWING THE LOCATION OF FARMS, STATIONS AND SUB-STATIONS IN THE EXPERIMENTAL FARMS SYSTEM, THE AGRICULTURAL COLLEGES AND AGRICULTURAL SCHOOLS

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J. B. SPENCER, B.S.A., Director of Publicity.

EDITORIAL COMMENT

A RECORD of performance for dairy cattle has been in operation for some time in Canada. Now, a similar system has been inaugurated to register egg-production under regulations that will make the record dependable. The value of testing and recording production in the dairy herd is well known. It does not, of course, increase the flow of milk, but it marks the low producer for elimination. The standard of the herd is raised by using sires of high producing ancestry, as determined by the record; and it is now essential that the breeder, in order to find a ready sale for his calves, should produce evidence as to the milk capacity of the females appearing in the pedigree. Before the government commenced Record of Performance work, it was often difficult for the small breeder to dispose of sires, no matter how good his animals were. The smaller breeder preferred to buy from the prominent breeder, whose name and reputation were well established. With the evidence of the record as a guarantee of milk producing ancestry, the breeder of less prominence is no longer at a disadvantage, but can readily dispose of his surplus. Authentic recording of egg-production should bring similar benefits both to the poultry breeder and poultry keeper. The purchaser of male birds will have a guarantee that they come of a strain that will raise the output of his flock of birds, and thereby make them more profitable.

* * *

IN the department estimates for 1921-22 a small sum has been included to meet the cost of inspection of the foundation stock for the Stud Book, just opened, for the registration of Canadian Silver-Black foxes. The work will be undertaken by the Live Stock Branch, and will likely continue for a couple of years. In view of the value of this industry, which has now become national, and in order to set a high standard at the outset, it is felt by the breeders that the inspection of foundation stock for registration in the first book should be done by the Dominion authorities. In view of the fact that this industry brings in millions of dollars annually for fox pelts, which are practically all exported, and also for live foxes, which are bought by foreign buyers, the small outlay necessary is entirely justifiable.

* * *

THE Veterinary Director General announces that arrangements have been made for testing, before shipment, pure-bred cattle purchased in Great Britain by Canadian breeders for export to this country. An officer of this department, Dr. C. Maconachie, has been stationed in England, and is prepared to administer the tuberculin test on request. By this means the shipment of reacting cattle will be prevented and loss and inconvenience to importers will be obviated. The measure was also necessary as a precaution against the introduction of diseased animals into Canadian herds now under test for accreditation. The arrangement is not necessarily a permanent one, and does not interfere in any way with the regular quarantine of such animals on arrival in Canada.

* * *

FOR cheese and butter shipments a refrigerator car service is necessary in order to insure that these commodities do not deteriorate in transit, and under an arrangement with the Dominion Department of Agriculture, the railways agree to operate such a service. For the prevention of loss with fruit and vegetables due either to over heating or freezing a form of insurance is being advocated which would enable carriers to provide adequate refrigeration or heating facilities as conditions made necessary. For this service an extra charge would be made by the carrier over and above the cost of transportation. There is much dissatisfaction among handlers of fruit and vegetables throughout the country over present regulations governing the movement of these commodities, and the efforts of the Fruit Branch are being directed towards securing a better state of affairs.

* * *

IN Peel county, Ontario, a woman Home Demonstrator is carrying on household science extension work. The position is held by Miss K. F. MacIntosh, who contributes an article to this number of *The Gazette*. The location in a community of a trained worker in home economics is the first move of its kind in Ontario, or indeed in Canada. It is a recognition of the claim of farm women to the same form of assistance as is accorded to the male portion of the community through the local agricultural representative of the provincial department of agriculture.

The Home Demonstrator shares an office with the Agricultural Representative, an arrangement which assists them to co-operate in their work; but her efforts are devoted to the interests of the women and girls of the community. A great deal of practical, instructional work is being carried on in the interest of better home-making, and the classes hitherto held in household science have been a marked success. As in the case of the agricultural representative, the work is being financed largely through the Dominion grant for Agricultural Instruction.

* * *

PART I

Dominion Department of Agriculture

DOMINION EXPERIMENTAL FARMS IN SASKATCHEWAN

Their Work of Great Value in Aiding the Farmer to Solve the Agricultural Problems of the West

BY ANGUS MACKAY, INSPECTOR, WESTERN EXPERIMENTAL FARMS

THE Experimental Farm system was brought into existence in 1886 by Sir John Carling, then Minister of Agriculture. The Indian Head Farm served the three Territories up to 1905, when the provinces of Saskatchewan and Alberta were formed. In 1908 and 1909, or until the Experimental Farms at Lacombe and Lethbridge commenced operations for Alberta, it continued to serve both provinces.

At the present time four Experimental Farms are operated in Saskatchewan: the Indian Head farm, of 680 acres, all under cultivation; the Rosthern farm, of 640 acres, all under cultivation; the Scott farm, of 480 acres, 400 acres under cultivation; and the Swift Current station, established 1920, and now in operation.

The Experimental Farms from the first have been for experimental purposes, and for the West were of very great value, especially for the Territories of which Saskatchewan, now a province, formed a part.

Work of Indian Head Farm

The Indian Head Experimental Farm, the pioneer farm west of Ontario, had for its work the testing of grains, grasses, clovers, fodder crops, roots, vegetables, fruits, trees, shrubs and flowers; also

the breeding and distribution of suitable live stock for the prairies, and above all, the cultivation of the soil in such a way that, no matter how dry the season might be, a crop would be assured.

Information on cultivation of the land was of pressing necessity, for in 1886, on account of excessive drought, the crops were almost a complete failure in every section of what is now the province of Saskatchewan. On only one farm in the Indian head district (partially owned by myself) were the crops good. This was due to summer-fallowing the land the previous year (Rebellion year 1885), which conserved sufficient moisture to produce a 30-bushel crop on several hundred acres, while thousands of acres over the district were an entire failure and were ploughed up. This success was followed up when the Experimental Farm was started in 1888, and has been the chief dependence for grain and other crops up to the present time, and it is safe to say, after over thirty years' trial, that fallowed land, first ploughed before July 1, and cultivated as each crop of weeds appears, is the only sure method of preparing land to counteract the dry seasons to which the province, and more particularly the southwestern portion of the province, is subject.

New Varieties of Grains Introduced

The Experimental Farms in Saskatchewan have tested from the first, and are each year testing, new varieties of wheat, oats, barley, peas, rye, etc., as well as the other products before mentioned, with the view of keeping this province in the front rank of production.

In the early years of the Experimental Farms, the Director—the late Dr. Wm. Saunders—obtained many hundred varieties of grain—especially wheat—from foreign lands, with the view of securing early and productive sorts for Canada, and especially for the new Western Provinces. In addition to the importations, the Director propagated by cross-breeding many hundreds, if not thousands, of varieties of wheat, oats, barley, and peas, and all have been thoroughly tested on the farms. The first wheat imported and distributed was “Ladoga” from Russia. It was ten days earlier than Red Fife, and succeeded in the Prince Albert and other northern districts, but was found to be of indifferent milling value on account of producing dark flour. The cross-bred sorts—Preston, Stanley, Huron, and Percy—found favour for a time, and then came Marquis in 1907, a year which will be remembered by every farmer in the province on account of the almost universal ruin of the crops by frost.

Advent of the Improved Wheats

Marquis, a cross-bred wheat, in that year on the Indian Head Farm, was the only sort on plots or field lots that matured before frost came, and it immediately came into prominence, and at present, from its milling qualities and earliness, is the variety almost universally grown, not only in the three Western Provinces, but in the states of North and South Dakota, Minnesota, and Montana.

“Ruby,” another cross-bred wheat, which is considerably earlier than Marquis, has been thoroughly tested on the farms in the province, and is one worthy of propagation in any district in Saskatchewan.

Like grain of all sorts, fodder crops have been continually under test; also roots and vegetables, fruits, trees, and shrubs; and neither expense, trouble, nor pains has been spared in finding suitable sorts for the prairies. Up to the time the Forestry Station took up the work of growing and distributing trees and shrubs, the Experimental Farm annually sent out to settlers from one to two hundred thousand seedlings, as well as many hundreds of small fruit bushes.

The farm at Indian Head has for many years been sending seed grain in car lots to Ottawa for distribution over all provinces in the Dominion.

Cultural Experiments

The three Experimental Farms in the province have for ten years been engaged in extensive soil cultural experiments, among which may be mentioned: depth to plough; treatment of summer-fallow and stubble land; applying barnyard and green manure; soil packing and seeding to grasses and clovers. In addition, crop rotation experiments have likewise been carried on at each farm for the past ten years, trials being made of 3-year, 6-year, 8-year, and 9-year rotations. These are proving valuable in decreasing the amount of land necessarily fallowed each year for wheat growing.

Stock-breeding and feeding tests have been more extensively carried on than formerly, and it is gratifying to know that, in many districts where at one time few or no cattle or sheep were raised, pure-bred herds of cattle and flocks of sheep are now found. The result of all experimental work carried out on the Experimental Farms in the

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province is published each year and reports are sent free to applicants.

Some Recommendations

In view of the serious set-backs to farming in some parts of Saskatchewan during the past few years and the prospective problems of the future, I submit the following recommendations after nearly forty years of active life on the prairies:—

(1) No land for general farming should be selected that has a gravel or sand subsoil. A few inches of top soil, either clay or sandy loam, is not suitable for grain growing. Eight inches at least of clay or sandy loam on top of a clay subsoil is fairly safe, while 12 or 14 inches will usually ensure success.

(2) As farming has been made fairly safe when the method of preparing land by summer-fallows is properly carried out, I would recommend that in future all land intended to be fallowed should be ploughed as deep as possible by the end of June, and all weeds killed as they appear by cultivation. All governments and municipalities should refuse seed grain or other aid to any farmer who fails in this part of his farm work.

Thousands of acres every year are not touched until well on in July or August, when weeds of every description (many in seed) have used up the entire available moisture and the work is rendered entirely useless.

Prevention of Soil Drifting

To stop drifting of the soil, the work on the Experimental Farm at Indian Head has shown that hedges will protect 80 feet of crop for every foot in height of hedge. A hedge 20 feet high will save 1,600 feet perfectly, and as much more from serious injury by winds. A rotation of crops, including grass for pasture, or hay, is invaluable, and old land that has been under grass for two or three years, when broken up, is safe from winds for at least four or five years. Ploughing summer-fallow twice, June and October—the last ploughing to bring to the surface soil that has not been pulverized by repeated cultivation—will also lessen the danger from soil drifting. Growing fall rye on summer-fallows instead of wheat, not only stops drifting, on account of the early and rapid growth before the winds commence, but is one of the best means known for the eradication of wild oats.

MEAT AND CANNED FOODS INSPECTION

Important Work Performed by the Department of Agriculture in Safeguarding the Canadian Consumer and in Maintaining Export Requirements

THE Meat and Canned Foods Act came into existence in September, 1907, as the result of regulations laid down by Great Britain in connection with meats, lard, etc., from the Dominions, and colonies, and from foreign countries.

The staff of the division of the Live Stock Branch in charge of the work comprised at that time about sixty inspectors. There were twenty-eight

establishments under inspection with 1,079,698 animals slaughtered from September 3, 1907, to March 31, 1909, a period of nineteen months. For the fiscal year ending March 31, 1920, there were fifty plants under inspection, and 3,738,214 animals inspected by a staff of 275 inspectors. The dressed weight of these animals aggregated 710,000,000 pounds.

The work involves a continuous inspection of packing houses from the opening to closing of the plant. Live stock get an ante-mortem and post-mortem inspection, which is the most rigid in the world to-day. All meats, etc., coming into plants from foreign countries or any other source get a minute inspection, while all meats shipped out are similarly treated, those for export to foreign countries being covered by certificates without which they could not enter foreign trade. During the period of the war, Great Britain and her allies made payments to packers only on the production of these certificates.

The inspection work in connection with fruit and vegetable canneries is very extensive, there being around 350 canneries, 150 apple evaporators, and about 25 milk condensories under supervision. These establishments get a frequent inspection from a staff of travelling inspectors, who spend all their time visiting the plants and seeing that products are fresh and clean, that sanitary conditions are kept up to a high standard, and that products prepared are true to name on labels. These labels

are submitted to the Veterinary Director General for approval before their use is permitted.

About May, 1920, the work of inspecting all imports of fruits and vegetables and their products was undertaken. The work is heavy, as imports are coming in every day, and it is necessary to see that they are kept up to Canadian standards as to quality. These imports include all food products from European *pâte de foie gras* to West Indian pine-apples, and are of a very varied nature, hundreds of different kinds of fruits and vegetables being included, both canned and sun-dried.

In January, 1921, all exports of fruits and vegetables and their products came under inspection, and certificates are now issued as to quality, purity, and quantity.

As Canada enlarges her population, the live stock industry must also increase. This means more packing plants and fruit and vegetable canneries and evaporators. A gradual extension of inspection work will therefore be necessary in connection with these industries, both for the protection of the Canadian consumer and the maintenance of export markets.

RESTORING THE APPLE ORCHARD TO PRE-WAR PRODUCTIVENESS

**What is Being Done by the Dominion Fruit Branch to Aid the Campaign
Now Being Carried on in the Apple Growing Provinces—Optimism
as to the Outlook**

BY C. W. BAXTER, FRUIT COMMISSIONER

THERE is no doubt but that a considerable portion of the loss of fruit trees, especially in the province of Ontario, during the severe winter of 1917-18, was the direct result of war conditions. In 1914 the crop was large, and when ready to harvest war had been declared and marketing was in a chaotic condition. Later, owing to

the great need of ocean steamship space for the transportation of troops and materials necessary for the successful prosecution of the war, an embargo was placed on the importation of apples into the United Kingdom; and with restricted markets many fruit growers became utterly discouraged and neglected their orchards. The weather during two

growing seasons was also unfavourable, and scab developed to such an extent as to reduce the vitality of the trees, and many were consequently unable to withstand the severe winter. To ascertain to what extent fruit growers in the provinces of Quebec and Ontario might profitably undertake the re-establishment of apple orchards, therefore, it is necessary to consider conditions affecting the industry as a whole; also other industries correlated to the fruit industry.

For several years prior to 1914 there was a great demand for nursery stock, but, following the big crop of 1914 (which on account of lack of proper marketing facilities resulted in unprofitable returns to the growers, many of whom concluded there had been overplanting), this demand automatically stopped. The nurserymen continued to care for their plantings for two or three years, but eventually had to consign large quantities of nursery stock to the brush pile.

Following the cessation of hostilities came a renewed demand for nursery stock and, as the supply was very far short of the demand, prices advanced. In fact, so great was the advance that, together with the labour shortage, the time did not appear opportune to urge the re-establishment of the orchards which had suffered from neglect and frost injury.

Having regard to these conditions, the Fruit Branch has endeavoured to emphasize the importance of growers giving the necessary attention to their orchards in order to produce the maximum amount of first-quality fruit, as

well as the advantages of proper methods of grading and packing, and the great need for proper marketing facilities.

During the past winter officers of the Dominion Fruit Branch, in co-operation with the Provincial Departments of Agriculture, have held meetings in the various parts of the provinces at which practical demonstrations were given in the proper methods of grading and packing, and the advantages to be gained by having all apples packed in a central packing house. Where convenient, demonstrations were also given in pruning. Spraying and co-operative marketing were also thoroughly discussed. The attendance at these meetings, and the keen interest taken in all subjects discussed, indicate that greater attention will be given orchards during the present season than has been given for several years, and as the supply of nursery stock will no doubt be greatly increased within the next two years and the price correspondingly reduced, orchards in Ontario and Quebec will undoubtedly be re-established very soon.

Growers have every reason to feel optimistic as to the future of apple growing in Canada. The industry as a whole made no progress during the past eight years for the reasons already stated and, although prices for many agricultural products have declined during the past year, the price for the best quality of apples has not shown any corresponding decline, nor is it likely to do so owing to the fact that production, even under favourable conditions, at the present time is estimated to be not greater than it was twenty-five years ago.

SHEEP EXTENSION WORK IN QUEBEC

Clubs Organized for the Purchase of Pure Bred Sires—Better Returns in Meat and Wool Result—Sheep Husbandry Demonstrations and Feeding Contests Carried on, and Co-operative Marketing Promoted

BY A. A. MACMILLAN, CHIEF OF SHEEP AND SWINE DIVISION, LIVE STOCK BRANCH

STEADY growth has marked the development of the sheep industry in the province of Quebec, which now has a sheep population of over a million head. As the province is for the most part admirably adapted to sheep rearing, and as conditions warrant a further expansion of the industry, a big field for extension work presents itself.

An analysis of the sheep industry in Quebec, however, indicates that too many scrub rams are being used, that too little attention is given to the trimming and co-operative marketing of lambs, that there is a lack of knowledge pertaining to the feeding and management of the flocks in many sections and that there is room for improvement in the pure-bred flocks, tending to greater uniformity of type for the various breeds. The work of the Live Stock Branch has been directed towards effecting advancement in this direction, and the details of the work have been carried out by Mr. P. Rodrigue and his three assistants, Messrs. Poulin, Elliott and Therrien.

Organization of Ram Clubs

The Montreal Market until recently was noted for the inferior quality of its lambs, but to-day it stands almost on a par with any other market, and even in some respects is superior in that more uniform shipments of excellent quality lambs are made from certain districts in the province.

The improvement can be attributed almost entirely to the continued and much more general use of pure-bred sires. In the English-speaking sections

there are sufficient pure-bred breeders to produce sufficient rams for breeding purposes and for a number of years they have been distributed and sold by means of individual and auction sales. In the French-speaking sections the first pure-breds were introduced through the medium of the distribution policy for the loan of pure-bred rams and also by sales held by the provincial department. Rams so distributed demonstrated the value of pure-bred, both as regards the production of market lambs and a good fleece. This paved the way for further work, and in 1919 the community breeding principle was introduced through the organization of ram clubs.

When a ram club is formed, twenty-five rams of one breed are purchased by sheep raisers in the district. Yearling rams are preferred, good prices are paid, and a purchasing agent does the purchasing for the club. At the end of every two years the rams are interchanged among members as long as their period of usefulness lasts. This reduces breeding costs to a minimum and permits of the greatest possible co-operative use of pure-bred sires.

To date thirteen of these community centres have been organized in the province and more are under the process of organization at the present time. Data accumulated last summer showed that the use of pure-bred rams by club members has resulted in an average gain in live weight of lambs at marketing age of ten pounds as compared with the weight of lambs from scrub rams and flocks of similar breeding. In addition to the added weight, lambs from these clubs, when shipped in carload lots, owing to uniformity and the fact that

they were properly docked and castrated, sold at from 50c. to \$1 per cwt. more than prevailing market prices for the week.

The pure-bred sires are also having a marked effect on the quantity and quality of the wool. The increase in weight of fleece is placed at 1½ pounds, and the quality in first cross progeny will, in most cases, be raised by one grade. Farmers in these clubs estimate that the pure-bred rams have paid for themselves the first year.

Co-operative Marketing of Wool and Lambs

During the spring months a large number of barn demonstrations were given on the shearing of sheep and the rolling and tying of the fleece, as well

as the docking and castrating of lambs. The grading of the Quebec wools was centralized for the most part at Lennoxville, Quebec, and the total amount of wool graded in Quebec was increased to a total of 209,453 pounds. The Quebec warehouse provided by the Canadian Co-operative Wool Growers, Ltd., proved a decided advantage in the sale of the 1920 clip and the bulk of the wool was sold before the real slump in the market took place.

The demonstrations in docking and castrating resulted in a decided increase in the number of lambs marketed co-operatively. The following table gives a statement of this phase of the work and includes shipments in which the sheep promoters were directly connected:—

MARKETING REPORT.

County	No. Cars	Sheep				Lambs			
		Number		Avr. Wt.		Number		Avr. Wt.	
		No. 1	No. 2	No. 1	No. 2	No. 1	No. 2	No. 1	No. 2
Sherbrooke.....	6	53	58	125	100	552	76	85	65
Stanstead.....	5	32	46	126	100	506	55	83	63
Ottawa.....	2	5	.....	115	.....	220	.....	81	.....
Argenteuil.....	4	46	.....	126	.....	259	40	79	56
Compton.....	14	125	39	126	103	1,119	143	79	52
Temiscouata.....	2	.....	.....	.....	.....	72	93	79	58
Dorchester.....	2	.....	19	.....	105	36	81	76	60
Rimouski.....	5	9	41	123	102	205	445	88	58
Lac St. Jean.....	12	.....	.....	.....	.....	960	184	77	59
Chicoutimi.....	6	.....	.....	.....	.....	444	192	72	56
Beauce.....	3	.....	.....	.....	.....	165	312	74	53
Totals and averages.....	61	270	203	123.5	102	4,538	1,621	79.4	58

It was found that where shipments were closely supervised and a man sent in charge the shrinkage did not exceed 7½ pounds. This effected a great saving in shipping costs.

Flock Feeding Contests

Realizing the necessity for developing proper feeding and management methods in conjunction with the use of better rams and breed improvement work, it was decided to co-operate with the provincial department in establishing flock feeding contests whereby

prizes would be offered to flock owners using a pure-bred ram who would score the highest number of points for housing, equipment, feeding, pastures, and condition of flock and lambs at time of marketing. Each contest provided for a minimum entry of twenty-five. During 1920, nine of these feeding contests were organized in the counties of Compton, Sherbrooke, Beauce, Dorchester, Rimouski, Temiscouata, Lotbinière and Lac St. John. The first inspection in these contests is now practically completed and gives evidence of doing much

to bring about up-to-date and improved methods in flock management.

Ram Grading

Following the lead of the pure-bred breeders in the three Maritime Provinces, the pure-bred sheep breeders in Quebec have asked for the grading of rams to be made effective on stock being offered for sale in the fall of 1921. The grading of rams in Quebec will undoubtedly do much to assist breeders in the sale of their stock and aid the purchaser who buys by mail. It will also tend to raise the general average and uniformity of type within the breeds.

Other Activities

In addition to the above-mentioned projects, the promoters are active in furthering the sheep industry from practically every angle. They assist in the purchase, sale and distribution of breeding stock; deliver lectures on the various phases of sheep raising; assist at Short Courses; address annual meetings of the Wool Growers' and Sheep Breeders' Associations, and are active in every phase of organization that tends towards the advancement of sheep raising within the province.

DAIRYING MADE PROFITABLE THROUGH COW-TESTING

A Gain of Fifty Per Cent in Average Yield in Three Years—Growth of the Movement Results from Departmental Efforts

BY A. H. WHITE, B.S.A., SENIOR DAIRY PROMOTER

SOME years ago, an American dairy expert who had made a study for ten years of the records of the herds of his state, remarked that it was his conviction that the weak spot in the dairy industry was the poor cow. A study of the records received during the past year reveals the fact that there are still many poor cows in the herds of this country. The poor cow in the herd is even a greater drag to-day than several years ago because of the high cost of feeds and the high wages to be paid to labour.

It does not take a master of higher mathematics to figure out the benefit in dollars and cents which would accrue to the farmers, and therefore to the country, if the production per cow could be raised even 500 pounds in the next three years. This could easily be done by weeding out the "boarders" and by feeding the good producers a little more feed in a better balanced ration. But

these results can never be obtained unless a much larger percentage of our dairy farmers realize that there are poor cows in the herds throughout the country, even in their own herds, and take immediate steps to base their policies of herd management on facts obtained by the milk scales and Babcock test and not on guess work as is so often the case.

Many farmers, however, who are dependent upon the dairy cow for a livelihood, do not realize the value of dairy records to them as a means of increasing production in the herd. True, the mere figures obtained by weighing the milk of each cow periodically and having a test made for butter fat, will not increase the production of those cows. The information alone can accomplish nothing, but this information backed by intelligent action on the part of the farmer would soon make each individual cow a profitable one.

But many farmers are increasing their herd production by following a systematic policy of weeding out the poor cows which come below a certain standard of production and by only saving calves from the best producers and from the very best pure-bred sires that they can afford to buy. One or two examples will show what has been done and thousands of farmers have had similar experiences. An Ontario dairyman started in about twelve years ago with a common herd of grades which were producing about 5,000 pounds milk each. After twelve years, by careful selection and ruthless weeding out of poor cows, he now has a herd of eleven cows which averaged in 1920, 10,351 pounds milk and 370 pounds fat. Three or four of these cows were two-year-old heifers and the average length of the milking period was 10.8 months. Three of the cows in this herd produced more than 13,000 pounds milk and 460 pounds fat. Another man has increased his production by over 100 per cent since he began to keep records and follow a systematic policy towards increased production.

These are only two examples of many, and after three years of this work, farmers have had increased average production in their herds ranging from 25 to 50 per cent. If every farmer would keep records for the next three years, and after the first year weed out every cow which did not make a fair profit above feed costs, there would be a big decrease in the number of dairy cows, but a great many farmers would be money in pocket, and in three years the production of milk would be increased enormously because of the better class of young stock coming into the herds.

A brief analysis of the records of the Ontario herds which were tested for the full year will show that even in the better herds there are nearly always one or two poor cows. Furthermore, where there has been no systematic effort to grade up the herd for production, it is not uncommon to find a quarter of the

herd not even paying for the feed consumed, but undetected, they are still kept by their owner because he does not keep individual production records of each cow.

Last season 540 cows were recorded for the full year, the average production per cow being 7,094 pounds milk and 248.8 pounds fat. When compared with the estimated average production of the dairy cow in Ontario of something over 4,000 pounds milk, these figures clearly demonstrate the value of dairy records as a means of giving information which can be of very great assistance to the farmer in herd improvement. Although the average production of 540 cows was greatly above the estimated average for the province, still there were wide variations in the production of individual cows. For example, the best cow produced 14,160 pounds milk and 545.6 pounds fat while the poorest only produced 1,695 pounds milk and 79.9 pounds fat; and in comparing the best with the poorest cow in several herds, there is the same astonishing difference in production. Oftentimes the best cow produces three, four or five times as much as the poorest cow and generally under the same conditions with regard to care and feeding.

Again, by studying these records it is found that the best 135 cows, or one quarter of the total, had an average production of 9,593 pounds milk and 346.8 pounds fat, while the poorest 135 cows only produced an average of 4,364 pounds milk and 158.4 pounds fat, which is about equal to the estimated production for all dairy cows in Ontario. Fifty-four cows produced less than 4,000 pounds milk and twenty-two produced less than 133 pounds fat. If all the cows in Ontario could be similarly classified according to production, it would mean that about one quarter of them are actually losing money for the farmers, but are allowed to remain in the herd because the farmer is putting all his cows on the same basis and has

made no effort whatever to know the individual production of his cows.

During the past year, individual milk records were kept of 33,382 cows in 3,847 herds at 564 different centres from Prince Edward Island to British Columbia. These centres were of various sizes, some including only one or two farmers, while in others there were as many as fifty farmers with over 1,000 cows under test. There was a decided increase in comparison to the number of herds and cows under test in 1919, when only 2,416 herds and 22,517 cows were recorded. This increase was largely due to the success of the work done by the Quebec Dairy Instructors in their respective districts during March last year to interest the dairy farmer in cow testing.

In addition to the records kept for these herds, many farmers have been supplied with the milk record forms to keep account of each cow's production themselves but who were not near enough to an organized centre to have samples tested regularly for butter fat. Many farmers are also supplied with feed record forms and are keeping a record of the feed consumed by each cow and thus are able, at the end of the year, to determine exactly the earning capacity of each cow in the herd and the profit she makes above cost of feed.

Not only are records kept for the farmers through these testing centres, but the Dairy Promoters are working to increase production by urging the use of pure-bred sires and by

showing the farmers what can be accomplished by using more and better feed. One example will illustrate how the farmers of a community or district are being assisted through these centres. It had come to the notice of the Dairy Promoter in Nova Scotia that a great many farmers made no effort at all to provide a supply of succulent feed for their cattle during the late summer when pastures are low and burned up nor did they make provision for a winter supply of this kind of feed. There was a campaign put on amongst the farmers by means of meetings and circular letters to urge them to sow oats, peas and vetches as a soiling crop or as a silage crop. Seed was distributed through the testing centres to the farmers and many of them sowed small areas of this crop. Altogether over 100 acres were sown and the results obtained were so manifestly beneficial that the farmers are sowing larger areas this year.

In Prince Edward Island and Saskatchewan, greater production competitions were promoted by the provincial authorities, assisted by the Dairy Promoter of the Dairy Branch, and awards were based on the records kept by the Dairy Branch. Many farmers in every province were assisted in selecting and obtaining pure bred sires and many grade sires have been replaced in herds where dairy records have been kept during the past year or two.

RECORD OF PERFORMANCE FOR POULTRY

Canada the First to take the Advanced Step of Establishing a Record of High-Producing Birds

BY F. C. ELFORD, DOMINION POULTRY HUSBANDMAN

RECORD of Performance for poultry is now an established fact, and has been in operation since November, 1919. At the present time there are two classes or mediums through which the records are obtained. "A" the trap-nesting of birds upon the breeders' own premises inspected by officials of the Department of Agriculture, and "AA" Egg Laying Contests operated by the Experimental Farms in each province of the Dominion.

Record of Performance is a new thing as far as poultry is concerned, Canada being the first country that has taken it up as a national proposition. It is also one of the most advanced steps in poultry work that has occurred, and the poultry world is looking with considerable interest to see how this problem will be worked out.

There are three main advantages to Record of Performance, the scientific value of the records for breeding purposes, the protection which authenticated records give to the buyer, and the stimulation which records give to production.

Those who read poultry papers as well as agricultural papers have no doubt been struck with the claims of high production made by numerous breeders, in some cases by breeders who do not even operate trap-nests upon their own plants. The unfortunate part of this advertising is that these claims are sometimes taken at their face value by the amateur or the uninitiated, and as a result many

purchases are made of stock or eggs that have a record only on paper.

Owing to Record of Performance, the time may not be far distant when any person wanting to purchase eggs or stock will be able to get just what he is paying for, and it will not be necessary for him to rely upon the word of the seller alone, for official papers showing the production of the parentage will be available.

The contests which are used as a medium for Record of Performance "AA" are being held in each province open to the breeders of that province, and in addition there is a Canadian Contest which is open to the world. Six of these provincial contests started in November, 1919. They were situated as follows: Nappan, N.S., Cap Rouge, Que., Brandon, Man., Indian Head, Sask., and Lethbridge, Alta. In November, 1920, the provincial contests were increased to nine, the three new ones being situated at Agassiz, B.C., Fredericton, N.B., and Ottawa, Ont.

The advertising value of these contests is considerable. Breeders who have pens well to the top make a name for themselves that practically no other system of advertising can equal. The contests also create a great deal of interest in the general public in that they emphasize production. Breeders are anxious more than ever to breed up a good laying strain and buyers are demanding that birds or eggs which they purchase shall be from high producing birds or strains.

APPLE MARKETING IN ONTARIO

Conditions Reviewed—Lack of Shipping and Selling Organizations the Chief Drawback—Standardization of Product Essential—Possibilities Unsurpassed in Any Other Province

BY C. W. BAXTER, FRUIT COMMISSIONER

AS an apple growing province, Ontario offers possibilities which are unexcelled by any other province in Canada. In fact, its geographic position provides some marketing advantages which are unattainable by other provinces. Its commercial apple producing districts are in the midst of the best of local markets, including Toronto, Ottawa and Montreal and many other cities and large towns; and in addition it is very conveniently situated for supplying the large consuming centres of the prairies, while the port of Montreal is also easy of access for the export markets. The varieties that are of the highest quality and in greatest demand, both on the home and export markets, do exceedingly well, and can be produced at a cost not exceeding in some cases less than in other provinces but, notwithstanding these possibilities and advantages, it cannot be said that the apple industry in Ontario has progressed to the same extent as in other parts of the country.

This is due in part to the fact that, in Ontario at least, 75 per cent of the crop is produced on mixed farms where the grower's time is of necessity divided. Unfortunately as a result on many farms the orchard receives little or no attention, it being left entirely to the tender mercies of nature, no attempt being made to combat the numerous destructive insects and diseases which take a heavy annual toll.

How the Ontario Crop is Handled

The methods employed in harvesting and marketing the apple crop of Ontario are practically the same as those obtaining during the past twenty-five years.

The bulk of the crop is graded and packed in the orchard under varying weather conditions, which are very often unfavourable, and by labour provided by the grower and obtained locally. No facilities being available for storing the packed fruit against frost, it is necessary to get the fruit packed and shipped within a very short period, depending upon the season. Owing to the limited time of employment, it has been difficult to obtain skilled labour, and growers have been compelled to compete with each other in securing labour, and to employ whatever local help was available, whether experienced or inexperienced, more frequently the latter. These conditions are both unsatisfactory and expensive. They do not permit of the proper care and attention being given to produce a uniformly graded and properly packed output.

The methods employed in marketing have been various. When the crop is short, there is no difficulty in finding a profitable market. There is competition between local dealers and wholesale dealers in market centres, but, when the crop is medium or large, there is comparatively little buying, and the only alternative has been to consign. Very soon the large centres become overstocked, while others are often undersupplied. The tendency of individual effort has always been towards large centres and this is not surprising as there is not sufficient time to develop new markets, and the expenditure would be out of all proportion to the value of the crop.

A small portion of the Ontario crop is also marketed through fruit growers' organizations operating independent of each other. Although a few of

these have been fairly successful, generally speaking, individual co-operative effort has not worked out satisfactorily. There have been many co-operative fruit growers' organizations formed in Ontario during the past twenty-five years, but only a comparatively few of these are functioning to-day, and few, if any, handle their fruit through a central packing house. The principal cause for the failure of these organizations is evidently their inability to successfully market the crops. In some cases the manager, who is also the salesman, has been selected from among the members and, although successful as a grower, has not had the time nor opportunity to gain sufficient marketing experience to dispose of the product to the best advantage. To engage a fully qualified salesman, who would devote all his time to the work, would be to incur an expenditure out of proportion to the value of the crop.

Methods in Other Provinces

The methods employed in harvesting and marketing in Nova Scotia and British Columbia are very different from those in vogue in Ontario. The bulk of the crop, instead of being graded and packed in the orchard, is hauled by the grower to the packing house, which has been specially equipped for the work, and where it can be done at a minimum cost. This method is followed both by fruit growers' organizations and dealers, and the work performed by employees who, having fixed standards to guide them, are able to obtain uniformity in the pack which is not possible where the work is done in the orchard. Even inexperienced help very soon becomes efficient under the central packing house system. When necessary, employees can be moved from one packing house to another, and the longer period of employment under this method is a further inducement to engage in the work.

In regard to marketing in Nova Scotia and British Columbia, the satisfactory results of centralized endeavour are so well known that they need scarcely be referred to. There are, however, one or two outstanding examples of what has been accomplished that are worthy of note.

British Columbia's natural market, by reason of her location, is the Prairie Provinces, where there is keen competition from the Northwestern States, whose growers are also well organized. British Columbia growers did not feel secure in depending upon the Prairie markets to take their crop against this competition and they have therefore established sales agencies in many large centers and brokerage connections where they have not their own representatives, so that they no longer feel they must meet the prices of their competitors on these markets if not satisfactory.

Similar results have been obtained by growers in Nova Scotia through centralized endeavour. In 1919, with a crop of approximately one and three-quarter million barrels, they were able to find a profitable market in the United States for approximately 500 cars of low grade and cull fruit, for which there was no market in Canada, and this would have been impossible had there been no central selling agency and no co-operation between growers' organizations and dealers.

Ontario has always had more or less difficulty in securing a supply of refrigerator cars in big crop years, and last year was no exception. Especially is this the case for shipments to the Prairie Provinces where refrigerator cars are required early in the season. There has been no co-ordination between shippers to cope with this problem; each has acted independently of the other.

The transportation companies are not without their responsibility in providing

an adequate supply of suitable equipment, but this responsibility can be more definitely fixed when growers anticipate their requirements well in advance of the shipping season, and so advise the transportation companies.

Shipping Problems Overcome

Nova Scotia and British Columbia growers and shippers have accomplished a great deal through their shipping and traffic associations. Last year, when contracts for Ontario apples were being cancelled owing to the inability of growers and shippers to secure cars, British Columbia through the Traffic Association, co-operating with the railway companies, had an ample supply. The shipping and traffic organizations in both these provinces are composed of fruit growers' organizations and dealers.

One of the most outstanding examples of what can be done by concerted effort was accomplished by the Nova Scotia Shipping Association some months ago. The market for apples in the United Kingdom had for some time been weakening and prices had dropped to where it was unprofitable to ship unless something could be done to offset this decline. The regular steamship lines were asked to lower the ocean freight rate, but could not see their way to do this. The association then sought to charter fifteen steamers for straight cargoes, and in this they were successful, and at a rate approximately \$1.00 per barrel cheaper than the rate then being charged. Not only did this benefit the members of the association but other shippers as well, as the regular lines subsequently lowered their rate 75 cents per barrel.

Lack of Selling Organization

I have endeavoured to outline briefly the methods employed in other provinces in marketing the apple crop and the results obtained and to compare them with

those of Ontario. And this brings us to the point of asking if a selling organization and a transportation organization are essential to the success of the apple industry in other provinces, are not these equally essential to the success of the industry in Ontario? It is my opinion that they are even more necessary, and furthermore that the fundamental principles and methods governing these are adaptable to Ontario conditions. It is true that the area served by these organizations in British Columbia and Nova Scotia is considerably less than the apple growing area in Ontario, but this should not mean any insurmountable difficulty. It will be noted that in both British Columbia and Nova Scotia, the shipping and traffic associations are separate from the marketing organizations. The shipping associations, composed of growers, selling organizations and independent fruit shippers and dealers, have but one objective, namely, improved transportation and all that that term stands for. The growers and shippers realize that unless they are in a position to solve the many transportation problems, they cannot succeed in marketing.

While independent co-operative organizations offer some advantages over individual effort, it is practically impossible for these to successfully compete with other provinces and districts where growers are thoroughly organized and have established an efficient central selling association. In view of this growing competition, one hesitates to recommend the further organizing of growers into independent units until there has been established a central selling organization with which they can affiliate and to which they can turn over their product to be marketed.

Centralize Selling and Standardize Product

The tonnage of the organizations now in existence, if centralized, is sufficient to warrant the expenditure necessary to

establish an efficient and economical central selling organization. The greater area covered by these units might necessitate the establishing of two sub-centrals, one in Eastern and one in Western Ontario, both under the control of the central.

Standardization is essential to the success of such an organization. We have certain grades that have been established by Federal legislation which have done much to advance the apple industry, but these are only minimums and permit a great variation in values packed within the grade requirements.

By the establishment of brands which represent specific qualities and which are uniformly present at all times, the grower who produces the highest quality

of fruit is assured of receiving returns accordingly. This also establishes confidence with the trade, and permits trading at long distances.

In addition to the establishing of brands, the central would establish sales agencies in sufficient numbers to obtain the widest possible distribution, anticipate the requirements of its members with respect to supplies, estimate the crop, and be prepared to quote prices well in advance of the dates of shipping, co-operate with the transportation companies in the matter of car requirements, in order that a sufficient number of cars may be assembled within an accessible area, and direct the operations of the local organizations with respect to harvesting and shipping.

THE DOMINION EDUCATIONAL BUTTER SCORING CONTEST

Uniformity and High Grade of Product and the Standardizing of Method of Manufacture the Object—An Ideal Type of Canadian Butter Aimed at—Rapid Improvement Noted

BY GEO. H. BARR, CHIEF, DAIRY DIVISION

THIS contest was started in May, 1919. Arrangements were made with the provincial dairy authorities to select four creameries in each province that would manufacture and ship to Montreal monthly from May to October inclusive, one 14-pound box of butter. The method of manufacturing the butter was left entirely with the creamerymen and provincial experts. Blank churning records were supplied to each creamery, and these were filled in and forwarded with the samples. Upon arrival in Montreal, the butter was placed in cold storage and held at a temperature of from 12 to 15 degrees F. After a few days in store, the samples were scored by Mr. P. W. McLagan, Montreal, Mr. J. B. Muir, Ingersoll, Ont., and the writer, and they were re-scored for flavour by the same judges occasionally during the season.

The principal objects of the contest were, (1) to establish a uniform type of creamery butter throughout the Dominion, (2) to create a healthy rivalry between the provinces in producing a high grade of butter, and (3) to help in a Dominion wide standardizing of methods and practice in the butter-making industry.

At the beginning of the contest there was a very marked difference in the character of the samples forwarded from the different provinces, but each month this difference became less noticeable. The improvement was no doubt due to each competitor being furnished with a detailed statement of the churning records and scores of all the samples each month.

In the 1919 contest thirty-five creameries participated by sending a total of 181 samples. Possibly the outstanding

feature of the 1919 contest was the marked difference in the keeping quality of the butter made from pasteurized and unpasteurized cream. One hundred and fifty-four samples were made from cream pasteurized at an average temperature of 172 degrees F., and 27 samples from unpasteurized cream. The difference between the scores for flavour when the butter was received and the rescores after 2 to 5 months' storage showed that the flavour had deteriorated almost three times as much in the butter made from unpasteurized cream as it had in the butter made from pasteurized cream. Effective pasteurization, which means heating the cream to 160 degrees F., and over, was determined by the use of the Storch Test. If no reaction is shown by this test, it indicates that the cream has been heated to at least 160 degrees F., or higher. Such a temperature will practically destroy all the injurious bacteria and enzymes in the cream.

The value of the test is shown by the following figures from the 1919 contest: 130 samples gave "No Reaction," and at the last rescore only 6 per cent of the samples were placed in "Off" grade; 31 samples gave a "Light Reaction," and at the last rescore 35½ per cent of the samples were placed in "Off" grade; 20 samples gave a "Strong Reaction," and at the last rescore 50 per cent were placed in "Off" grade.

The 1920 contest was conducted on exactly the same lines as that of 1919, except that the churning records and scores were sent to every creamery in Canada. Thirty-one creameries sent a total of 166 samples. Only 12 of the creameries that participated in 1919 were in the 1920 contest. The butter was scored by the same judges as in 1919. At the opening of the contest there was not such a marked difference in the type of butter from the different provinces as in 1919 and, before the contest closed, it was impossible to tell from

which province any sample came. The advantage of pasteurization was again shown by the samples from unpasteurized cream deteriorating in flavour slightly more than twice as much as those from cream properly pasteurized. It was also shown that butter made from cream heated to 145-150 degrees F., deteriorated in quality almost as much as that made from the unpasteurized cream.

One of the features of the 1920 contest was a comparison of the keeping quality of butter made from cream "neutralized" and unneutralized before pasteurization. The deterioration in flavour between the first score and the last rescore on 27 samples of butter made from "neutralized" and properly pasteurized cream was slightly less than that on 98 samples from cream properly pasteurized without neutralization. The neutralized cream contained .382 per cent of acid before pasteurizing and the unneutralized .268 per cent. The neutralizing of sour or high acid cream will not insure a high grade of butter, but it does produce a condition in the cream which makes pasteurization more economical and effective, and gives the butter better keeping quality.

In the 1920 contest the moisture was very much better incorporated in the butter than in 1919. This is an important point, as there is a very great loss in cutting up butter when the moisture is not properly incorporated. The old style of leaky butter is becoming a thing of the past.

The most important point about butter is its flavour and it is interesting to note the standing of the different provinces in respect to this particular point. In scoring butter 45 points are allowed for flavour and the standing is based on the average score of all the samples from each province.

Standing for Flavour by Provinces

1919 Contest

- 1st...Quebec
- 2nd...Manitoba
- 3rd...Alberta
- 4th...Saskatchewan
- 5th...British Columbia
- 6th...Nova Scotia
- 7th...Prince Edward Island
- 8th...New Brunswick
- 9th...Ontario

1920 Contest

- Alberta
- Quebec
- Nova Scotia
- Manitoba
- Saskatchewan
- Ontario
- British Columbia
- Prince Edward Island
- New Brunswick

The buttermaker cannot always control the flavour of his butter, but he has control of the texture, incorporation of moisture, colour, salt and package and by these points we judge the workmanship of the buttermakers. In scoring,

perfect texture is given 15 points; incorporation of moisture, 10 points; colour, 10 points; salt, 10 points; package, 10 points. The standing for workmanship is determined on the average of these scores on all samples sent from each province.

Standing for Workmanship by Provinces

1919 Contest

- 1st...Alberta
- 2nd...Nova Scotia
- 3rd...Manitoba
- 4th...Quebec
- 5th...Prince Edward Island
- 6th...Saskatchewan
- 7th...British Columbia
- 8th...New Brunswick
- 9th...Ontario

1920 Contest

- Nova Scotia
- Alberta
- British Columbia
- Quebec
- Saskatchewan
- Prince Edward Island
- New Brunswick
- Ontario
- Manitoba

The highest scoring samples in the 1919 contest were from Tantallon, Sask., and Gentilly, P.Q., with a total score of 98.5 points out of a possible 100. The highest scoring samples in the 1920 contest was from Birch Hills, Sask., with a total score of 97.5 points.

The score for salt is based on the requirements of the British market. In 11 samples which the judges considered too highly salted, the average per cent salt in the butter was 2.8. The average per cent salt added to these samples at working was 3.47. The 15 highest scoring samples in 1919 had an average of 1.4 per cent salt in the butter with 2.73 per cent salt added at churning. The 11 highest scoring samples in 1920 had 1.09 per cent salt in the butter and 1.89 per cent was added at working.

Samples from these two contests have been exhibited at the dairymen's conventions in every province of the Dominion, at the dairy schools, at produce merchants' conferences, butter graders' conferences and butter scoring competitions. There are few buttermakers in the Dominion who have not seen in these samples the ideal type of Canadian butter and made personal comparisons of the keeping quality of butter made by different methods, thereby securing valuable information that has never before been available in the creamery industry.

The contest will be continued in 1921. The plan will be changed somewhat to include a larger number of creameries and also reduce the work of the contestants by having fewer samples than in the 1919 and 1920 contests.

(1) The contest will cover the same period as the two former ones, viz., six months, from May to October, inclusive.

(2) The sample (a 14-lb. box of butter) must be made between the 1st and 15th of each month and shipped by express, charges collect, to the "Dairy and Cold Storage Commissioner, c/o Lovell & Christmas, Montreal, Que.," to arrive on or before the 20th of the month.

(3) The Provincial Dairy Commissioners are asked to select a different creamery each month to participate in

the contest, and to advise the creameries of the selection. Each creamery participating will send only one sample.

(4) Blank churning record forms and full shipping instructions will be mailed from Ottawa to each creamery participating as soon as the names and addresses are received.

(5) The butter will be scored a few days after arrival in Montreal, and copies of the churning records and scores will be sent to every buttermaker in Canada.

PREVENTION OF LOSS IN THE SHIPMENT OF FRUITS AND VEGETABLES

A Question of Vital Importance to the Fruit and Vegetable Grower—Enormous Losses in the Transport of These Products Under Present Conditions—A Carriers' Protective Service Advocated

BY G. E. MCINTOSH, FRUIT TRANSPORTATION SPECIALIST

ONE of the problems which is necessary to solve, particularly in this period of re-construction, when the consumer is looking for a downward trend in the cost of living, is that of preventing waste of foodstuffs during the process of transportation.

So far as fruits and vegetables are concerned, it is impossible to estimate the loss and waste that occurs each season from frost or over-heating in transit. That it is tremendous is conceded by everyone cognizant of the facts and acquainted with the enormous tonnage of perishables that requires to be transported during the cold period. The service now available—that is to say a heated refrigerator car service on a mileage basis—is fairly satisfactory for short-haul movements, but it is not satisfactory for the long-hauls and the carriers have not so far suggested any improvements for this traffic. Recently, on sixteen carloads of Canadian apples, moving to one consignee, claims were presented for damage in transit, amounting to \$5,892,

or approximately \$1.60 per barrel. One Ontario shipper in referring to the present service states: "We have this day a telegram from consignee on a heated car of fresh apples that went out from a Dominion Atlantic point along with another car. The one has arrived cooked and the other frozen."

It is true, cases such as cited are the subject of claims, and eventually no doubt are paid. That is not the point. No fruit producer or shipper wishes to sell his product in this way. It is most unsatisfactory to bring fruit to the stage of marketing and have it damaged in transit.

The introduction of a carriers' protective service by Canadian Railways will go a long way towards solving this problem. A carriers' protective service would place definitely the responsibility for such loss, and would assure proper care in transit. It would be as beneficial for the carrier as the shipper.

The carrier wants the full earnings of the traffic and the shipper

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certainly does not want to be compelled to file claims. By such a service the carriers would accept shipments of fruit and vegetables, say from October 15 to April 15, inclusive, assume, apart from the liability now provided for negligence and omission in transit, full liability for loss or damage by frost or overheating, and for such a service the carriers would be permitted to assess such charges as may be agreed upon between the carriers and the shippers, or as may be ordered by the Board of Railway Commissioners. Such a service would be distinct from the freight transportation service, and would be something for which there would properly be a separate charge. The carriers would become the insurers, and the charge should be something in excess of the actual cost of the service, in order that the carrier may not be out of pocket.

With the introduction of the heated car service some years ago shippers expected the railways would assume the risk of damage. They claimed that the railways were selling a certain service to the public and that the responsibility or risk for the safe transportation of the goods, should be definitely assumed by the carrier and should not be left to the shipper, dependent upon claim proceedings or upon any uncertain or indefinite rule.

At a sitting of the Board of Railway Commissioners in Ottawa, January 7, 1920, in answer to an inquiry as to whether, under present conditions, the carriers accepted the risk, the representative of the Canadian Pacific Railway Company made it quite clear that they did not.

It was on this occasion that the proposition for a carriers' protective service in Canada was first brought to the attention of the Board, it being submitted on behalf of the fruit and vegetable shippers of the Dominion that the charges then in effect for heated refrigerator car service were ample for the

service given; that the railways in Canada should be required to furnish a carriers' protective service for long-haul shipments; and that shippers would not object to reasonable charges, provided the responsibility of the carrier was clearly defined. It was suggested that interested parties should make a formal application to the Board. This has recently been done by the British Columbia Traffic and Credit Association, in behalf of the fruit and vegetable shippers of that province. The application is for an order of the Board, requiring Canadian carriers of British Columbia fruit and vegetables to provide a service such as outlined. This has been supported by the Western Canada Fruit Jobbers' Association, with a suggestion that it be made applicable to all provinces.

The application now before the Board of Railway Commissioners, is for a carriers' protective service such as will give a measure of stability to the fruit and vegetable business in a direction in which these industries, so far as winter marketing is concerned, are now practically at the mercy of the weather and the carriers.

In presenting the case for the British Columbia shippers, it was pointed out that it is not the actual loss on any particular shipment that is the real concern, but rather the element of risk, which debars the distributors from purchasing as freely as the production and the consumption demands. The application is to secure a working arrangement that will meet the situation. The service should be available from October 15 to April 15, inclusive, each season, and effective from and to such points as trade conditions demand.

British Columbia shippers, through the British Columbia Traffic and Credit Association, are on record before the Board of Railway Commissioners as favouring charges as follows:—

To Alberta points	\$30 per car
Saskatchewan points ..	40 " "
Manitoba points	50 " "
Ontario points	60 " "

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Deducting the present heating charges of 1½ cents per mile, this would provide

an insurance fund roughly as follows:—

Alberta points.. . . .	\$22	per car with average haul	530	miles
Saskatchewan points.. . . .	27	" " " "	"	\$30 "
Manitoba points.. . . .	33	" " " "	"	1,130 "
Ontario points.. . . .	36	" " " "	"	1,600 "

The charge suggested by the British Columbia shippers are approximately 64 per cent higher than that proposed by American carriers, but refused by the Interstate Commerce Commission for lack of substantiation, and nearly 100 per cent greater than the charges now effective on American lines.

In asking the railways for a service that entails increased operating costs, we must consider that while gross earnings of Canadian railways were stimulated by the recent rate concessions, nothing appears to have happened of a favourable nature in respect to net earnings. As a matter of fact, they have actually declined. Adequate service can be provided only in two ways: out of earnings, or by borrowing. If a carriers' protective service for perishable food-stuffs is a necessity in Canada—and I agree with the finding of the Interstate Commerce Commission where they state: "We are convinced that there is a vast opportunity in protective service against both heat and cold for conservation not only of carrier revenues, but of food products of the nation"—then we should be willing to pay a charge which will protect the carrier against loss and assure an efficient service. It would appear, however, even though the risk may be a trifle greater on Canadian

traffic, that a charge nearly 100 per cent greater than that which the Interstate Commerce Commission evidently think is just and reasonable in territory somewhat similar, would be a rather generous attitude to assume. The Western Canada Fruit Jobbers' Association have suggested, considering the trifle more hazardous territory covered in Canada, the rate here should be approximately 25 per cent above the American rate. Whatever the charge may be, it should be fixed on a per 100 lb. basis for certain mileage areas.

The reference thus far relate to shipments moving in insulated or refrigerator cars. There must always be a proportion of the fruit and vegetable tonnage move in box cars. It is not always possible for the carriers to supply insulated cars. This is a serious matter for the industry, as the risk of damage by frost is present with box car shipments from the early part of October on. If a considerable portion must move in this class of equipment, then some arrangement for protection should be worked out. The only practical way, perhaps, would be for the carriers to supply lined box cars when refrigerators are not available, and provide the protective service, at a very slight advance, if any, over the rate charged on insulated, or refrigerator, cars.

DAIRY REFRIGERATOR CAR SERVICE AND CARGO INSPECTION

**Products Reach Destination in Good Condition, Resulting in Better
Returns and Enhanced Reputation**

BY J. F. SINGLETON, CHIEF, MARKETS DIVISION, DAIRY AND COLD STORAGE BRANCH

THE transportation of dairy products under proper conditions as regards temperature, sanitation, etc., is a matter of great importance to the dairymen of this country, as, no matter how fine in quality butter and cheese may be when it leaves the hands of the manufacturers, its value is reduced if it is allowed to deteriorate during transit to market.

Refrigerator Car Service for Butter

Previous to 1895 there was no organization to provide for the carriage of butter in less than carload lots in refrigerator cars in Canada. Creameries could not make weekly shipments in refrigerator cars without paying freight charges on a minimum carload of 20,000 pounds, and few creameries had adequate cold storage facilities to hold butter until a carload was available for shipment. The service for the carriage of butter was commenced in 1895 when arrangements were made whereby refrigerator cars fully iced were operated during part of the season on the main lines of the Canadian Pacific and Grand Trunk railways leading into Montreal. These cars were used to pick up small lots of butter as offered at the different stations at the usual "less than carload" rate without any extra charge for the icing or for the special service.

Schedules were prepared by the railway companies showing the days on which the cars would be operated and the approximate time of departure from the different stations en route. This permitted delivery of butter to the different stations at such times that the butter would be placed in the iced cars with the

least possible exposure. During 1896 the service was extended and in 1897 iced butter cars were operated over the main railroad lines leading into Montreal and other important market centres. The service has been extended from year to year and during 1920 cars were operated weekly over sixty-five different routes.

The railroad companies provide the refrigerator cars and arrange for icing the same. The Government guarantees two-thirds of the freight earnings of a minimum carload from starting point to destination, plus \$8 per car towards the cost of icing. These cars may be used for egg shipments but not for other produce.

Refrigerator Car Service for Cheese

In order to demonstrate the value of iced refrigerator cars for cheese, arrangements were made in 1902 with the various railway companies whereby the companies provided one hundred iced refrigerator cars weekly for two months, for the shipment of cheese to Montreal, the Government paying the cost of icing. The season of operation of such cars has since been lengthened and they are now in operation from early in June to about the end of the first week in September each year. The number of cars operated has been increased from time to time, and during 1920 one hundred and sixty cars weekly were available.

Refrigerator Car Inspection

For some years subsequent to the inauguration of the iced butter car service, travelling inspectors were employed who accompanied cars on the various routes, and recorded the temperatures

at which the different consignments of butter were received at the cars. Valuable information was gained in this way and the creamerymen were impressed with the undesirability of having the butter arrive at the station any considerable length of time previous to the arrival of the iced car. Inspectors are now located at Toronto, Montreal and Halifax. It is the duty of such inspectors to see that cars are in proper condition and have been properly iced. They also report the condition and quantity of produce carried, whether it was properly stowed, etc. The information is reported daily to the office at Ottawa and any deficiencies in the service are immediately taken up with the proper railroad authorities. During the past season the inspectors examined on arrival at destination 1,226 refrigerator cars which carried 324,924 packages, or 18,190,132 pounds of butter.

Benefits of Refrigerator Car Service

As a result of the inspectors' work in securing data as to temperature of butter when delivered to the cars, better storage facilities have been provided by the creameries. The service has effected a great saving to the producer in transportation costs. Most of the butter handled by this service would necessarily be handled by express were the refrigerator car service not available, and the difference between the freight and express rate is frequently more than one-half cent per pound. On a basis of one-half cent per pound difference, the saving in transportation charges during 1920 amounted to \$90,000. The cost of maintaining the service is approximately \$12,000 yearly. The saving in transportation cost is not the only benefit derived from the service, as the product reaches its destination in much better condition when shipped in a refrigerator car as a much lower temperature is maintained.

As a result of the refrigerator car service for cheese, the product has arrived in Montreal in a much improved

condition. Excessive heating, so common to transportation in an ordinary box car, is avoided, and the advantage is seen in improved flavour, texture and appearance, as well as in less loss of weight.

Cargo Inspection

Inspection of cargoes in the trans-Atlantic service was first undertaken in 1900. Inspectors are now located at Montreal and other Canadian ports as well as at London, Liverpool, Manchester, Bristol and Glasgow in the United Kingdom. The inspectors in Canada watch the loading on ships of all perishable food products and report the names and addresses of consignors and consignees, quantities, marks, condition of packages and contents, and where stowed in the ships.

Thermographs, or recording thermometers, are placed with cargoes of perishable food products destined to ports in the United Kingdom at which inspectors are stationed. The inspectors in the United Kingdom report the manner of discharge of cargo, condition of packages and contents, and transmit any complaints from the trade regarding quality, manner of packing and condition. They also remove the charts from the thermographs and mail them to the Dairy Commissioner at Ottawa. Blue prints of these charts are made and furnished to the steamship companies, to the chief engineers of the steamers, and to interested shippers.

Adverse reports from inspectors located either in Canada or in the United Kingdom are transmitted to shippers, and if the consignments are improperly handled or stowed the steamship company is also advised.

Results of Cargo Inspection

The cargo inspection service has been the means of securing decided improvement in the packing, handling and stowing of produce, and better ventilation

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of ordinary cargo space has been provided.

Before this branch put into operation its system of cargo inspection, great damage resulted from the carrying of perishable products in poorly ventilated cargo space at a high temperature. The efforts of the branch have succeeded in educating shippers and carriers in the necessity of the proper packing and the

carrying under proper temperature and ventilation conditions of perishable products sent overseas, with the result, not only that much of the loss previously experienced is now eliminated, but the reputation of Canadian products has been considerably enhanced by the better condition in which they can be offered to the foreign consumer.

RECORD OF PERFORMANCE FOR DAIRY CATTLE

Breeders Enabled to Locate Sires with Ancestry of High Milk-Producing Capability—Improvement of Milking Herds the Result

IT is recognized that improvement of the milking herds of the country is largely dependent upon the dairy qualities bred in the sires employed from year to year. It is recognized further, that all pure-bred dairy sires do not possess inherited dairy qualities of a high order. It was to guide dairy farmers in the selection of sires which could be depended upon to improve their herds, that the Record of Performance test was primarily inaugurated by the department. The test, however, besides fulfilling this object, has been the means of developing and bringing into prominence in the various breeds many families of high producers, all tracing back in a direct line to some outstanding Record of Performance female.

The result of the work is that breeders of milking herds are now enabled to select sires of their respective breeds from high-producing ancestry, whose

tests have been supervised by disinterested officials, and have performed their work at home under normal farm conditions. The result of such work affords a truer record of the capabilities of the cows of various breeds than any number of public tests at fairs or exhibitions or even at the farm homes, when the tests do not cover the full milking periods.

The development of the work of the Live Stock Branch of the Department has shown a steady increase in this connection. Up to the present time, 15,960 applications for entry have been accepted and 4,616 certificates have been issued. Following is a summary of the number of cows entered in the Record of Performance during the past four years and those that have qualified during the same period; also the corresponding numbers for 224 days in 1920:—

NUMBER OF COWS ENTERED FOR THE RECORD OF PERFORMANCE

	1916-17	1917-18	1918-19	1919-20	1920 224 days
Ayrshire.	633	614	568	752	387
French-Canadian	40	21	36	30	32
Guernsey.	27	19	23	33	41
Holstein.	598	540	598	767	405
Jersey	189	246	245	455	229
Shorthorn.	137	153	141	155	103
Total.	1,624	1,593	1,611	2,192	1,197

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NUMBER OF COWS QUALIFIED

Ayrshire.. . . .	229	175	194	176	135
French-Canadian .. .	16	14	3	8	12
Guernsey.	8	5	3	..	8
Holstein.	225	173	175	217	115
Jersey	67	68	76	96	57
Shorthorn.. . . .	50	53	45	61	28
Total.	595	488	496	558	355

COWS THAT HAVE PRODUCED ENOUGH MILK AND FAT TO QUALIFY BUT HAVE FAILED TO CALVE WITHIN FIFTEEN MONTHS AFTER COMMENCEMENT OF TEST

Ayrshire.. . . .	28	33	43	10	22
French-Canadian .. .	2	2	2	1	2
Guernsey.	2	..	..	3	..
Holstein.	44	56	70	75	28
Jersey	10	7	17	25	13
Shorthorn.	14	15	12	15	7
Total.	100	113	144	159	72

The number of bulls that have qualified by sireing four or more qualified progeny from different dams since the inception of the test is as follows, by

breeds: Ayrshire, 76; French-Canadian, 2; Guernsey, 1; Holstein, 81; Jersey, 18; Shorthorn, 8.

INSECT ENEMIES OF THE POTATO AND THEIR CONTROL

Spraying the Main Factor in Determining the Yield of the Potato Crop

BY GEO. E. SANDERS, DOMINION ENTOMOLOGICAL LABORATORY, ANNAPOLIS ROYAL, N.S.

THERE are roughly four controllable factors governing the yield of potatoes, i.e., fertilizer, cultivation, seed, and spraying. Many growers obtain the best seed available and fertilize and cultivate in the best possible manner and yet neglect the spraying, which is the most important of all. Experiments prove conclusively that \$12 spent in spraying is worth twice as much as a ton of 4-8-10 fertilizer in increasing the yield of potatoes.

According to our experiments, around 100 bushels per acre increase was obtained from the use of \$40 worth of fertilizer, or the increased crop resulting from the use of fertilizer cost forty cents per bushel. The increase in crop due to spraying ran over 200 bushels per acre

and cost less than \$14, or the increased crop due to spraying cost around seven cents per bushel, on the acre plots at the Kentville Experimental Farm in 1919. The unsprayed field gave 221 bushels per acre and the sprayed 398. A difference due to spraying of 177 bushels or the increased crop was obtained at a cost of less than nine cents per bushel. I am not decrying the value of fertilizers. I fully believe in the use of plenty of high grade material, but I wish to emphasize the value of spraying which costs less than one-fifth as much per acre as fertilizer and gives twice as great returns or is *ten times* as valuable considering the amount of money invested. It will be understood, however, that these results were obtained in the Maritime

Provinces where late blight is prevalent, and that the difference would not be so marked in parts of the country where this disease is not found.

What to Spray With

Bordeaux mixture is of course the spray for the potato. During the past few years we have found it advisable to increase the strength of the mixture as the season advances. Starting with 4-4-40, the second spray should be 5-5-40 and the third and later sprays 6-6-40. Spraying should begin when the plants are six inches high in order to control the potato beetles and blight. As an absolutely safe and foolproof poison for potatoes we recommend arsenate of lime, one and one-half pounds to 40 gallons of bordeaux. There are two brands of arsenate of soda on the market, arsenoid and sol-arsato. Both are excellent poisons in bordeaux and cost about the same as arsenate of lime. White arsenic, also, is a good potato poison.

White Arsenic Cheapest Poison

White arsenic and hydrated lime, equal parts, is the cheapest of all arsenicals. The value of such a mixture has been thoroughly demonstrated on a number of farms in New Brunswick. The directions for making this new mixture must be followed closely, for there is danger in using poison straight or not in conjunction with bordeaux, or in any manner but exactly as recommended. The great saving, however, that results from its use makes it worth while for all potato growers to learn how to use it. The cost is about one-fifth that of other poisons or to put it in another way, one can make a white arsenic bordeaux and the total cost of the white arsenic, bluestone and lime will be approximately that of paris green or lead arsenate. In addition, one has a better sticker than paris green, a more rapid killer than lead arsenate, and the fungicidal value of bordeaux as well.

The method of procedure is as follows: to each ten gallons of water intended for bluestone stock solution add two pounds of the mixture (equal parts of white arsenic and hydrated lime) poison, stir this in and then into this dissolve ten pounds of bluestone. This will make a green precipitate. Always stir before using. Use this green mixture as if it were a solution of bluestone, each gallon containing one pound in solution. Add the proper quantity of lime and test with litmus in making bordeaux just as though no poison were in the bluestone solution. All growers who used enough solution, 70 to 100 gallons per acre per application of white arsenic bordeaux controlled the potato beetles.

Amount of Spray per Acre

Apply at least 80 gallons of poisoned bordeaux in the strength recommended per acre, and apply the spray at intervals of from ten days to two weeks from the time the plants are six inches high until they die of old age or the frost kills them. If the weather is damp and rainy, spray oftener; if dry, make the intervals two weeks. If your sprayer will only apply 60 gallons per acre per application, use it at intervals of from seven to ten days apart. If you have a hand sprayer that only applies 40 gallons per acre, go over the field twice at each application. When using poison, apply the poisoned bordeaux when the slugs are just beginning to appear. It takes a lot less arsenic to kill a small slug than a half grown one. Above all use common sense and judgment in spraying. Don't think that applying 40 gallons per acre once or twice through the season will grow a large crop of sound potatoes. Such spraying often eases a man's conscience and enables him to say that he has sprayed, without breaking any of the commandments, but in order to control insects and blight successfully, there must be a certain amount of copper and a certain amount of arsenic applied to

each acre, and it must be renewed often enough so that a continuous protection is afforded to the plant.

Potato Aphids

In 1918, and again during the past year, there was a very severe outbreak of these insects in New Brunswick. The potato aphid not only does a great deal of damage in the years when it is present, but it is the carrier of mosaic, so its injury continues for years after outbreaks through the increased amount of mosaic caused by it. Potato aphids also render plants susceptible to bordeaux injury, and last year we had numberless complaints of bordeaux mixture and copper arsenic dust burning plants. This injury is all secondary, and as a matter of fact, when a plant becomes so infested with aphids as to be susceptible to bordeaux burning, it is past storing tubers and therefore useless. Although there was burning there was no monetary loss.

Potato aphids hibernate for the most part on the rose plant, both wild and cultivated. Root out all of the wild rose bushes in the neighbourhood of potato fields and spray cultivated roses in the spring, about the time the first potatoes are coming up, with Black leaf 40 at the rate of a tablespoonful to a bucket of water.

The potato aphid is one of the insects, in the control of which steps must be taken before the outbreak occurs. In other words, controlling potato aphids is like insurance—you buy your protection not knowing whether you will need it.

To control aphids use one pint of Black leaf 40 to each 100 gallons of bordeaux and apply at high pressure and with an up sprayer. The spray must hit the insect in order to kill. Apply Black leaf 40 with the first two or three application of bordeaux. It is particularly advisable for growers of seed potatoes

to spray thoroughly for potato aphids. In no other way can they hope to keep down mosaic in years of aphid outbreaks.

Flea Beetles

Few people realize the immense amount of damage that is caused by the small, black flea beetles that are found hopping about the potato for the first few weeks after it comes through the ground, in districts where this pest is prevalent. In order to determine this point, Mr. G. P. Walker of the Dominion Entomological Laboratory, Fredericton, N.B., carried on several experiments, which showed that the stunting that potatoes get in the early part of their growth from holes being eaten in the leaves by flea beetles, may in severe outbreaks amount to over 100 bushels per acre. In one case he got an increase in yield of 138.2 bushels per acre from controlling flea beetles alone.

The best treatment is to apply a repellent, and we find that bordeaux mixture is the best for this purpose. No poison is required in flea beetle control as they absolutely refuse to eat a plant that is coated with straight bordeaux.

If flea beetles are plentiful on potatoes when they first appear, apply a good coat of 4-4-40 bordeaux. Continue this every week up until the middle of July. It pays as well to protect the young plant from injury as it does the half grown plant.

Dusting Potatoes

We are getting some very good results from a new dust especially on small plots with hand machines.

The new dust for potatoes is made up of 15 pounds dehydrated copper sulphate, 8 pounds arsenate of lime and 87 pounds of hydrated lime. This material is dusted on the plants as a mechanical mixture, and the dampness of the leaf or the air forms a bordeaux. The only essential difference between it and liquid

bordeaux is that the liquid bordeaux is made in the spray tank, and in the other arises from a combination which takes place on the leaf.

We have obtained excellent control of potato beetles with the new dust, but on the whole it has been somewhat inferior to liquid in the control of blight. In small plots, with a hand duster, we usually get good blight control. I am convinced that the new dust is as good in

insect and disease control as liquid, but that its failure to measure up is due to poor application. When power dusting machinery for the potato improves sufficiently, I look for the time when we can recommend dusting in place of liquid spray. To-day we recommend dusting for the man with an acre or less who will not or cannot spray. He can use a hand duster and get very good results.

THE ADMINISTRATION AND ENFORCEMENT OF EGG MARKETING REGULATIONS

FOR the purpose of administering the regulations in regard to the marketing of eggs under the provisions of The Live Stock and Live Stock Products Act, Canada is divided into sections, Eastern and Western. The eastern section covers Ontario east of Port Arthur, Quebec and the Maritime Provinces. The western section covers territory west of the Great Lakes, including Port Arthur.

The Egg Inspection Service was for the ten months January 1 to November 1, 1920, called upon to make 965 inspections covering 334,111 cases of eggs. Of these, 148,668 cases were exported to Great Britain, 73,243 cases being fresh eggs and the balance, 75,425 cases, storage eggs.

There is a substantial increase in the requests for inspection during 1920 as compared with 1919. The significance of this increase is to be specially noted insofar as the attitude of the trade generally is concerned towards the principle of government inspection. Ninety-four inspections were made for local shipments. These were voluntary inspections, and produce dealers and packers bought from track shippers and country dealers on a graded basis, subject to government inspection. In this procedure there is a recognition of the principle of quality

payment and of the fact that the system of government inspection creates a bond of mutual confidence, is absolutely impartial, safeguarding the interests of buyer and seller alike. The buyer is given a guarantee of quality through the medium of the inspection certificate, and the markings placed on the case. The seller's interest is safeguarded through the work of inspection being done at the point of shipment and at the time of shipment. Inspection is by approval, the shipper being required to candle and grade the eggs according to the Canadian Standards marking the cases with the class and grade contained therein. When ready for shipment a requisition for inspection is made to the department. The inspector at the nearest point is notified to attend as requested, and calls upon the manager of the business for particulars of the shipment.

The method employed in inspection is to draw at least a five per cent sample from various portions of the lot prepared for shipment, in order that the sample may be fully representative. Upon examination if the inspector finds the eggs up to the grade marked on the cases, the shipment is approved, certificate issued, and the cases marked with the government mark of approval. This method of inspection is highly commended by the British importer, and it is largely due to

the efficiency of the system and the ability of the inspectors employed, that Canadian eggs are receiving a distinct premium on the British market.

In addition to actual egg inspection, inspectors are required to note the temperature of rooms from which eggs are taken, the condition of the eggs as to defrosting and sweating, outside temperature, temperature of car (if iced) into which eggs are loaded, manner of loading, weather conditions and any other points incidental to handling and transportation. Inspectors at seaboard are kept advised of shipments rolling to seaboard for export, and are required to report on condition on arrival, particulars on handling, loading, and stowing aboard ship. Further, they must keep in touch with market conditions and changes and make a daily report to the Poultry Division of the Live Stock Branch.

Constant activity is necessary to obtain definite information that will enable the department, in co-operation with the trade, to introduce improved methods of marketing that will eliminate preventable loss. Any abuse found in the system of marketing can only be eliminated by removing or remedying the underlying cause.

It is proposed to amend the present regulations to embrace a much larger proportion of the eggs marketed within the country than is at present the case, and also to provide means whereby foreign eggs imported into Canada for local consumption in competition with our domestic product may be effectively controlled, and in the light of experience gained during the past season, it is apparent there is need for a standardized filler. Reports have been received on consignments arriving in Great Britain in bad condition through breakage, and invariably light weight fillers are mentioned as a contributing cause. Owing to the high price of paper, many exporters have been forwarding their shipments in fillers of light weight that were used in storage. Where eggs have been transferred into heavy fillers, their arrival in Great Britain is reported in perfect condition.

There were two prosecutions during the past year for violation of the Egg Regulations, judgments in each case being given in favour of the department. The fact that the law states that no person can ship or accept for shipment, eggs covered by the regulations, unless the requirements of the regulations are complied with, reduces to a minimum the number of infractions.

SHEEP AND SWINE MARKETING COURSES IN ONTARIO

THE Sheep and Swine Marketing Courses held in Ontario this year constituted a new important feature of the regular four weeks' courses held annually by the agricultural representatives. The Sheep and Swine Division of the Live Stock Branch, in co-operation with the provincial Department of Agriculture, outlined the course which at most points was of three days' duration—two days being devoted to sheep and wool and one day to the bacon hog, although this was varied somewhat to meet local conditions.

Officers of the Dominion Department, Messrs. Jas. A. Telfer and A. E. MacLaurin, District Sheep and Swine Promoters for Western and Eastern Ontario respectively, conducted the courses, assisted by Jas. D. Thomson and H. Fraser, wool experts, and also by W. J. Howard, meat demonstrator. Lectures on marketing problems covered such topics as Co-operative Shipping, Market Grades, Feeding and Finishing, Wool Improvement, Problems Confronting Canadian Swine Raisers, Points to Consider in Selecting a Good Brood

Sow, and The Relation of the Live Hog to the Export Trade.

Demonstrations formed an important feature of the courses. These were held for the most part in the afternoons to give farmers an opportunity to attend in addition to the regular students. Besides demonstrations on the practical problems of sheep management, which included shearing, dipping, docking and castration, those in attendance were given an opportunity to judge market classes of sheep and swine. The relative values of the various classes from a market standpoint were given special attention. Another instructive feature

was the killing and dressing of a lamb, followed by a further demonstration in the proper method of cutting up a lamb carcass for lamb rings or local consumption.

A number of the courses concluded with a lamb banquet at which Canadian lamb was the main item on the bill of fare, the object being to increase the consumption of lamb as a meat. The prominent speakers included agricultural and textile representatives, and the showing of sheep marketing films provided a very entertaining and instructive evening.

THE EFFECT OF MOTOR TRACTION ON HORSE BREEDING

An Investigation to be Made by the Live Stock Branch

THE average horseman in Canada to-day, whether breeder or dealer, is more or less at sea regarding the outlook for the horse industry. Many have faith in the business, but, as one man put it, "they lack the facts and figures to back up this faith." The Department of Agriculture at Washington has made some investigations on the cornbelt farms with the object of finding out to what extent the tractor replaced the horse, and what percentage of the work was still done by horses. The Horse Association of America has investigated horse versus truck-power in the cities, and most of the findings have been published. In Canada, to date, practically nothing has been done in the way of investigation work. It would appear that the point has been reached

where investigation must be done by the Dominion Department of Agriculture or else it will be done by the American Association. A small amount has been provided in this year's estimates and this, if granted yearly for the next three years, should provide for the collection of the necessary data. This data, if given proper publicity, would not only stimulate the horse industry, but would go far towards bringing together the various allied interests. Once well started there is no reason to doubt that an association could be formed that would take care of the work. In view of the condition of the horse market for the last six years, it is felt that the starting of such an investigation would be not only good work but good business on the part of the Department.

EXHIBITS FOR THE PROMOTION OF THE POULTRY INDUSTRY

DURING the year 1920 exhibits having as their objects the promotion of the Poultry Industry of Canada were staged by the Live Stock Branch of the Department at forty-six of the large exhibitions and poultry shows, distributed as follows: Prince Edward Island 2, New Brunswick 2, Nova Scotia 7, Quebec 1, Ontario 13, Manitoba 1, Saskatchewan 9, Alberta 7, and British Columbia 4. Five exhibits are now in use, and on some occasions as many as three exhibits have been staged on the same dates in different parts of the country. It is difficult to arrive at any definite estimate of the number of people visiting these exhibits, but many thousands do so in the course of the year. As a direct result and proof of the interest taken in the exhibits there are the lists of names sent in requesting candling appliances and literature which run into the thousands, and also many requests by letter.

Special attention has been paid to graphically illustrating the 'Canadian

Standards for Eggs', The Egg Regulations under the 'Live Stock Products Act', 'Co-operative Marketing', 'Record of Performance for Poultry' and the 'Importance of Increased Production'. In connection with these, practical demonstrations have been given in the candling of eggs and the culling of poultry.

At the Toronto Exhibition in August last was put on probably the best egg and poultry exhibit ever staged by the Department. Candling and culling demonstrations were given daily, and a moving picture was shown illustrating the 'Co-operative Marketing of Eggs'. Large crowds were attracted to the exhibit daily and the success attending this particular exhibit points to the unlimited possibilities in exhibit work, particularly through the medium of motion pictures.

In connection with the Toronto Exhibition in 1921 it is proposed to stage a Live Stock Exhibit to embrace all the educational work being done by the Branch.

"I have always held, and still hold, that the raising of hogs is, year by year, one of the surest and safest revenues for the farm, and that the development of our export bacon trade is one of the most profitable and dependable industries that the country as a whole can get behind. But, unless Canadian farmers are prepared to accept responsibility for the future of the Canadian bacon trade, by supporting it through steady production, year in and year out, under adverse as well as under satisfactory conditions, we can never make a success of the business. It is useless to attempt to build up an industry if the producers themselves are not prepared to carry it through to success, in spite of all difficulties that may be experienced and all competition that will have to be faced."—H. S. Arkell, Dominion Live Stock Commissioner.

PART II

Provincial Government Departments

DEMONSTRATION FARMS FOR QUEBEC

Announcement as to the Establishment by the Province of County Farms
where the Best Methods as Ascertained by Experiment
will be Put into Practice

BY L. PHILLIPPE ROY, CHIEF OF FIELD CROPS DIVISION

ANNOUNCEMENT was made last fall by the Quebec provincial authorities that a scheme of demonstration farms had been planned for the province of Quebec. This project was sanctioned by legislation at the last session, and is now about to enter the phase of practical realization.

The principle of the new policy appears to be generally popular among agricultural communities; as a matter of fact, few agricultural policies have created as much interest or attracted as much attention on the part of the public. While all are agreed upon the advisability of making this means of practical teaching available to the farmer, thus giving him an opportunity of seeing for himself the advantages of scientific cultivation, conceptions regarding such farms differ widely. This is not surprising, as there are so many ways of demonstrating agricultural facts that a scheme of this kind is not necessarily limited.

A suggestion was made that farms be purchased and worked in each district by the Government. This meant that the Government would have been expected to raise at once, as if by magic, magnificent buildings and bountiful crops. As to the possibility and the cost of such a scheme, compared with the revenue that might be derived from it, this was left for later consideration.

Articles have appeared in the press stating that experimental farms would be established by the Government in a number of counties. This is not quite correct; the mistake comes from a misunderstanding regarding the difference—a very marked difference—that exists between an experimental farm and a demonstration farm.

In order to throw more light upon the subject and to help public opinion to settle on this question, a brief definition of both terms is given herewith.

Experiment and Demonstration Defined

An experimental farm, as the name indicates, deals with operations of a rather technical nature, such as research work, comparative and scientific tests, etc., with a view to improving breeds, methods of cultivation, etc., and adapting the same to various districts, or various conditions. Such experimental work requires a well-trained staff and a special equipment, the use of which would not appear to be justifiable in ordinary farm management. The least discovery, even though it may have been very expensive, may repay its cost a hundredfold by the increase in value that may result from its application to the agriculture of a district or of a country.

THE AGRICULTURAL GAZETTE OF CANADA

The demonstration farm does not experiment. It carries, however, to completion the work of the experimental farm, and should be the final stage in agricultural teaching. It simply puts into practice the best methods, based upon experimental work. Thus, the very first year of the establishment of a demonstration farm a variety of wheat may be grown, the creation and selection of which has required ten years' research work on the experimental farm. The demonstration farm is nothing less than an average farm, well managed, according to soil, crops, and market conditions and requirements.

The farms planned by the Hon. Mr. Caron, and which are to be established in several counties of the province, are demonstration farms. Knowing by experience the difficulties the farmers have to contend with in many cases, the Minister of Agriculture wants to share their struggles and their problems, and to this end these farms will be established in the most representative places of the districts which they are to serve.

Details of Organization

The farm of a practical farmer is selected; the latter remains in possession of his land, but gives over the management of it to the Department of Agriculture for a certain consideration proportional to the number of acres. The area of the farm may vary from 40 to 100 acres; it must be easy of access and typical of the average farms of the district as regards the soil and the systems of cultivation.

The demonstration work deals with the three main factors of production: soil, crops, and cattle. Special attention is given to the soil, as regards the maintenance or the increase of fertility, good drainage, and, lastly, good tillage by the practice of the best methods of cultivation.

The crops are grown in a special rotation. The seed used must be pure in variety and answer the requirements of the district. Proper steps will be taken to protect the crops against damage that may be caused by insects or diseases.

In order to improve the live stock, the Department will encourage the farmer, through annual grants, to keep nothing but pure-bred sires for cattle, pigs, and sheep, and to practise cow testing, tuberculin tests, etc. Additional grants will be given to the farmer when he is called upon to perform various and important operations tending to the improvement of the land, such as under-drainage, etc. The various grants offered by the Department to the farmer-manager shall be strictly proportional to the effort displayed by the latter with a view to making a model farm of his establishment. The agreement passed between the Department and the farmer shall be for five years and can be renewed by mutual consent.

The administration and technical management of these demonstration farms have been given over to the Field Crops Division and placed in charge of expert agronomists. The latter will work in close co-operation with the agronomists of the districts where farms are established, and will duly take into account the experience gained by these agronomists regarding the special needs of their district.

The district agronomist will thus be kept well informed of all the methods of cultivation practised on the farm, and he may arrange for farmers' excursions whenever the latter may seem advisable. A system of book-keeping will be followed, so as to keep track of the financial cost of the operations and also of the yield and cost of production of the various crops. Such data, when collected on various farms, under different conditions, may be of great value by giving information on the conditions and requirements of agriculture in the various districts of our province.

Time an Essential Factor

The above is a summary description of the proposed scheme and shows the results that may be obtained under ideal conditions. Lest we should be considered too optimistic, let us hasten to say that we fully appreciate the great difficulties involved in the management of such farms, as it supposes, among agronomists who are entrusted with the same, a thorough knowledge of the principles of agriculture and of the laws of agricultural economy. The success of the scheme will depend on the happy combination of these essential factors. Quick results are not looked for, nor is it expected that such results

will be very complete, as in agriculture everything is uncertain and many factors intervene over which man has little or no control. Draining, the restoration of fertility, the destruction of weeds, and the improvement of live stock require, in addition to capital, a great deal of time and a great deal of perseverance — these are pre-requisites. Farmers are therefore requested to wait patiently for results. These results, in any case, might be looked upon with suspicion if they came too quickly, and they should be about equal to those which may be expected on a well-managed farm belonging to an independent farmer.

UNIVERSITY EDUCATIONAL COURSES FOR FARMERS

BY PROF. W. T. JACKMAN, UNIVERSITY OF TORONTO

A NEW departure has been made this year in the matter of education for the farmers, which shows great promise of present and future value. For some time the United Farmers of Manitoba have been considering the problem as to how they could best meet the needs of the men and women on the farms for an education which would prepare them for more effective business relations and for becoming more capable leaders in their communities. But it was not until recently that this project culminated in a plan by which, under the joint auspices of the University of Manitoba, the Manitoba Agricultural College and the United Farmers of Manitoba, a course of lectures on rural economics and sociology was given in connection with the University, supplemented by special lectures upon a variety of subjects which would appeal to the people of that province. The course on rural economics consisted of an hour's lecture followed by one hour of conference and discussion each forenoon and each afternoon, so that,

every day for a period of two weeks, four hours per day were devoted to the study of the economic problems of the farm and another hour was given to the presentation of special subjects which were also of immediate interest to the farmers. The interest manifested by all those present, in giving full consideration to the pressing issues considered both in the main and supplementary lectures, shows how vitally the farmer is related to the economic life of the community. It is not enough that he be able to produce abundantly from the land; his interests lie in the economic questions as to how to secure a more equitable distribution of the wealth which he helps to produce, how to combine labour and capital upon the land so as to obtain the utmost economy of each factor in production, etc. In this course of study economic principles, instead of being merely theoretical, are applied to the everyday matters with which the farmers have to deal; and the way in which the men and the women took hold of the subject and discussed its various

phases shows how deeply they are thinking along these lines. Moreover, they are not studying these problems with any narrow viewpoint but with a desire for the promotion of a better and more satisfying community life in all its aspects.

In Ontario, as a result of the collaboration of the United Farmers of Ontario and the Extension Department of the University of Toronto, a course of study was developed covering the subjects of rural economics, public health and hygiene, architecture, English literature and Canadian history. In this course six lectures were given upon each subject; and in this way three hours each forenoon for two weeks were employed. The afternoons were devoted to visiting places of interests and educative value, such as the legislature, the stockyards and abattoirs, the Massey-Harris Company's plant, the Royal Ontario Museum, etc. Keen interest has been taken in this work by the entire body of two hundred and eighty seven who were enrolled in it.

A new impetus has been given to the educational life of both these provinces as a result of this intimate and vital

contact of those engaged in agriculture with those engaged in our highest educational institutions. It has meant much to all concerned. It has been an intensely valuable experiment, but in each case it has reached beyond the experimental stage and is now established as a permanent development to be planned for each year. It means much to the farmers to come in contact with those who know the farm life and its opportunities, as well as its needs, and who are giving effective thought to the solution of rural problems. And it means much also to the universities in the realization of their functions as the servants of all the people. The personal contact of these students among themselves, as well as with the lecturers and with those in charge of the direction and management of these public institutions, has created an entente cordiale which has also great promise for the future. This alliance, now firmly cemented, between the agricultural interests and those engaged in the highest educational work will be of inestimable value to both the urban and rural life of the provinces.

PLANT DISEASE INVESTIGATIONS IN WESTERN CANADA

**Great Loss Each Year due to Stem Rust of Wheat—No Effective Method
of Control as yet Discovered—Rust Resistant Varieties Needed—
Dominion and Provincial Workers Co-operate to Solve
this and other Intricate Problems**

BY W. P. FRASER, M.A., LECTURER IN AGRICULTURAL BIOLOGY,
UNIVERSITY OF SASKATCHEWAN

AS a distinct study, investigation of plant diseases was begun in Saskatchewan in 1917 by the establishment of a substation by the Dominion Division of Botany at the Experimental Farm, Indian Head, chiefly for the observational study of the stem rust. A conference of representatives

of the universities, agricultural colleges and Dominion experimental farms in Western Canada, and of the Dominion Division of Botany, at Winnipeg in the same summer, resulted in an agreement to co-operate in plant disease study, especially the investigation of the stem rust of wheat. According to the agreement the Dominion Division

of Botany was to appoint and pay the men to carry on the work, the universities and agricultural colleges to provide greenhouse and laboratory space. This agreement was carried out with the University of Saskatchewan in the spring of 1919. The station at Indian Head was retained as a substation, and most of the field experiments have been carried out there. Greenhouse studies and laboratory experiments have been conducted at Saskatoon. More recently, an appointment has been made to Winnipeg under the terms of the Winnipeg agreement.

Effective Treatment for Smut

While the chief work at Saskatoon and Indian Head has been the study of the stem rust, some time has been devoted to other problems. A study has been made of the Smut of Western Rye Grass, the life history and method of control has been worked out, and it has been found that the ordinary formalin seed treatment as used for cereals will give effective control. Some work has also been done in the control of the Stripe Disease of Barley. Experiments carried on last year confirm the value of the method which has been used in the United States, that is soaking the seed two hours in the ordinary solution of formalin. In our experiments it reduced the infection from over 50 per cent to about 4 per cent. A solution of acetaldehyde was also tested in the field as a substitute for formalin, and was found to be ineffective. Though it reduced the infection due to smut, compared to formalin it was relatively valueless. The dry method of seed treatment for smut control on cereals, that is, spraying with a strong solution of formalin, was found to be effective and safe for oats, but dangerous for wheat as it severely injures germination.

Overwintering of Rust Spores

Most of the work of the laboratory, however, has been on field observations

and greenhouse study of the stem rust. Some time was given to determine the origin of spring infection and the method of overwintering of the stem rust; whether the spores remain viable on straw or susceptible grasses; whether they are wind-blown from the grain fields to the south, or if the barberry is responsible. None of these problems have been definitely settled. It may be stated, however, that the stem rust has always been observed first on the barberry and has spread to grasses near, from which it can pass readily to wheat. This is the great danger of the barberry, it starts the rust early. Though there is no direct evidence that the spring infection arises from the barberry, it is certain that it is a menace to wheat growing and should be destroyed. That the summer spores of stem rust can live over the winter on grasses has been established by laboratory study, but it has not been proved that this is the usual method of spring infection. If this were the source of spring infection of wheat, it would be expected that the rust would appear first on grasses. All the observations, however, show that rust appears first on wheat and spreads to grasses. Rust usually appears over a considerable area about the same time, with the same degree of infection, which suggests that infection comes through wind-blown spores from the south. Rust was always noticed first in southern Manitoba and south-eastern Saskatchewan, and appeared later further west and north.

Rust Resistant Varieties

As the breeding of rust resistant varieties of wheat seems to be the most hopeful means of combatting the rust, and as Dr. Stakman has shown that a number of rust strains are present in the United States, greenhouse experiments were begun and are in progress to determine the number of rust strains, their prevalence and distribution in Canada. We were able to make use of

Dr. Stakman's work, though yet unpublished, and the varieties of wheat which he used to separate the various strains. In all about ten varieties of wheat and Emmer were used, which the different strains affect in different ways. For example, the most common strain of rust in Western Canada will infect all the varieties used as differential hosts except White Spring Emmer and Kanred, a winter wheat. Another common strain can infect all the differential hosts used except Kanred. Thus it differs from the strain mentioned above in being able to infect White Spring Emmer. Still another strain will only infect one of the five varieties of Durum used, but will readily infect Kanred. These results are definite and consistent, so by experiments of this kind we are able to separate distinct strains. Up to date eight strains have been isolated in Canada, and there is evidence of a number more. Often two or more distinct strains have been isolated from the same collection. It has also been shown that the strain which cannot infect Kanred and White Spring Emmer, but readily infects the other varieties used, is the most widely distributed, most prevalent, and appears earliest in Canada. The strain which attacks White Spring Emmer was prevalent in Saskatoon in 1919, and that year Emmer rusted heavily. In 1920 it was late in appearing and the Emmer in the fields was practically free from rust.

In connection with this work, rows of the varieties of common Spring Wheat, Durum and Emmer, which are known to have some resistance or which mature early, or are commonly grown in the United States and Canada, were seeded at various stations throughout Western Canada. This was done in co-operation with the Agronomists of the Agricultural Colleges or the Superintendents of the Experimental Farms, at the following stations in Manitoba: Morden, Winnipeg and Brandon; in

Saskatchewan at Indian Head, Saskatoon, Scott and Rosthern; in Alberta at Edmonton. The examination of these rows gave us data on the resistance of the varieties used, and some information on the strains present in those places, and formed a valuable source of material for greenhouse study. This experiment will be continued and expanded during the present season.

The rust problem is still far from solution. Every year is a potential rust epidemic year, and when favourable weather conditions come the losses of 1916 will be repeated. In 1916 the loss from rust ran into millions. Great losses have occurred in the years since then from stem rust, but have not been widespread enough to attract general attention. The reason why more has not been done by the Dominion Division of Botany is due largely to the difficulty in securing the services of trained men.

The study of rust strains was undertaken with the hope of obtaining data that might be of value to the plant breeder. The line of research that is the most promising in combatting the losses due to rust is that of breeding for rust resistance. Work of this kind is now being carried on at the University of Saskatchewan by Dr. Thompson. It would seem that the provincial Department of Agriculture could best aid in the solution of the rust problem by a generous support of his work.

Many other problems call for study in Saskatchewan: on the stripe and spot disease of barley, and the root rots of wheat, and to what extent disease organisms are responsible in the latter. Potato diseases also need investigation. Though good work is being done to-day in potato inspection and seed improvement in Saskatchewan by the provincial and Dominion Departments of Agriculture, yet it is also important that something should be done along the lines of investigation of these diseases.

WHAT THE AGRICULTURAL SOCIETIES ARE DOING

Plans and Projects for 1921

AGRICULTURAL SOCIETY ACTIVITIES IN MANITOBA

BY S. T. NEWTON, SUPERINTENDENT

THE lines of work to be undertaken by the Manitoba Agricultural Societies during the coming summer are mainly along improving live stock, field crops and poultry. All of the seventy-two societies will hold summer fairs. These fairs are held during the month of July and the first week in August, as it has been found in Manitoba that the fall fair is impracticable on account of the harvest and threshing season extending into winter. On that account the summer fairs are mostly confined to live stock, poultry, dairy products, and the arts.

In connection with almost all of the agricultural fairs child health conferences will be held. These are conducted in co-operation with the Public Health Department, and have proved a big success wherever tried.

At a considerable number of the summer fairs, demonstrations in cookery, canning, bread baking, dyeing, home decoration, live stock and poultry judging will be given by teams consisting

of either three girls or three boys from the Boys' and Girls' Clubs.

Ploughing matches are very popular, and about twenty-four out of the seventy-two societies will engage in this line of work. These competitions are mainly divided into two classes, one class where the motive power is supplied by the horse and the other where the gas tractor provides the power. The number of competitors at these matches range from ten to twelve at the smaller matches and from fifty to sixty at matches such as Portage la Prairie and Foxwarren.

Combined Seed Crop and Clean Seed

This is a new line of work and probably not more than twenty-five per cent of the societies will be able to get it organized and under way this year. Fully forty of the societies are conducting standing field crop competitions and will carry on seed grain fairs as well. The seed grain fairs usually take place during the latter part of November and the first half of December.

NEW BRUNSWICK'S PLAN OF WORK

BY M. A. MACLEOD, SUPERINTENDENT OF AGRICULTURAL SOCIETIES

In the province of New Brunswick, at the close of the last fiscal year, October 31, 1920, there were one hundred and fifty-four agricultural societies in good standing. In order to obtain a charter for an agricultural society, at least twenty-five farmers must club together and contribute as membership fees to their own treasurer a sum of at least fifty dollars. In order to maintain their

charter and keep in good standing from year to year, there must be twenty-five members, and fifty dollars or over must be contributed as membership fees or donations.

The primary object for which agricultural societies were organized in this province was the encouragement of the production of better livestock. In this respect some of the societies have done

and are doing exceptionally good work. In the districts where the societies persisted in the use of pure-bred bulls of one breed, one may find some splendid pure-bred and grade cows. Where a society skipped from one breed to another, however, and no attempt was made at community breeding, the live stock has not been improved, and it is doubtful if the cows are any better than when the society was first organized.

The majority of our societies are now planning to work with one or two breeds only and to avail themselves of the bonus system whereby any society may get a sum of money equal to 20 per cent of the cost price of any number of bulls up to five (but not for more

than two breeds of XXX quality), and 10 per cent of their purchase price for each succeeding year, the bulls remaining the property of the society if they are properly cared for so as to continue to qualify for the XXX class.

It is encouraging to note that the demand for XXX bulls of high producing ancestry is on the increase so much so that the breeder of pure-bred culls no longer finds a market for his stock through agricultural society channels.

Many of our agricultural societies purchase feeds, seeds, fertilizers and ground limestone co-operatively and deliver at cost, thus effecting a great saving to their members.

Year	Number of Societies	Number of Members	Membership Fees	Grants	How apportioned	
					Per Soc.	Per Dol. Sub.
1909..	76	5,685	\$ 8,282 50	\$ 9,578 23	\$63 50	0.61
1910..	87	6,447	8,573 18	12,455 00	68 00	0.61
1911..	97	6,749	8,482 00	12,700 00	67 00	0.75
1912..	104	6,905	9,140 00	13,947 00	63 00	0.71
1913..	106	6,911	9,131 92	16,000 00	72 00	0.84
1914..	112	7,106	8,914 50	16,450 00	71 00	0.87
1915..	115	7 127	9,299 00	16,875 00	71 00	0.87
1916..	125	8,141	9,662 55	17,000 00	66 00	0.80
1917..	136	8,508	11,225 58	18,000 00	63 55	0.77
1918..	151	9,873	13,250 00	19,000 00	60 10	0.685
1919..	153	10,281	14,285 00	19,000 00	58 50	0.6261
1920..	154	10,391	14,927 00	19,190 32	54 44	0.575

The foregoing table shows the number of Agricultural Societies in good standing, the total number of members, the total amount of membership fees contributed and the total amount of money paid as grants and how apportioned—so much per society plus so many cents per dollar subscribed for each year 1909 to 1920 inclusive. The membership lists for 1921 are not due at this Department until May first.

One of the most prominent advances made by our agricultural societies in recent years is the adoption of the system of holding monthly meetings. During the past year or two we have co-ordinated the meetings so that a number of adjacent societies hold their meetings on consecutive nights, thus making it easier for the Department to furnish

men to address these monthly gatherings.

By talking upon subjects suggested by the Department of Agriculture at the monthly meetings we find that the societies as a rule are ready and willing to co-operate in putting into effect any policies advocated for the promotion of agriculture.

In order that every member of the agricultural society, as well as other farmers, may keep in touch with the Department, news notes are supplied and published fortnightly in the columns of *The Maritime Farmer*, the efficient organ of the agricultural societies, and an arrangement exists with its publishers whereby the paper goes to all members.

THE AGRICULTURAL GAZETTE OF CANADA

Delegates from agricultural societies constitute the New Brunswick Farmers' and Dairymen's Association, which meets annually to discuss their agricultural problems and form an advisory

board to assist the Department of Agriculture.

The foregoing lines of work, together with the holding of fall fairs, constitute the programme of the majority of our societies for 1921.

APPLE ORCHARDS OF NOVA SCOTIA

BY DR. M. CUMMING, SECRETARY FOR AGRICULTURE

NOVA SCOTIA is one of the parts of the North American continent in which orcharding made a steady advance during the progress of the war as well as during the two years succeeding the war. The climatic conditions of the Annapolis valley and adjoining territory where fruit growing is developed in the province are such that there has never been any serious winter loss such as that which affected the growers along the St. Lawrence in 1917-18. Moreover, there are several vigorous organizations of fruit growers in the valley, including the United Fruit Companies, a business organization; the Nova Scotia Fruit Growers' Association, an educational organization, as well as private business enterprises promoted by men who make a business of dealing in fruit. Throughout the war period, these organizations kept up a strong agitation in favour of the continuance of an aggressive orchard policy on the part of the farmers. Their efforts were made doubly effective from the fact that, in general, marketing conditions were well maintained throughout those years and, on the whole, satisfactory prices obtained. Each successive year has seen a greater use of spraying and dusting material, a larger sale of spraying machinery, a heavier

consumption of fertilizer, a further development of co-operative and private marketing organizations—including the erection of more warehouses—and, in general, continued progress in all directions, except that very little new orchard has been planted.

On the whole, last year was one of the most successful years in the history of fruit growing in Nova Scotia. This success is being reflected in the large purchases of orchard materials now being made. Whether this will lead to any considerable increase in the setting out of new orchards it is difficult to say. However that may be, orcharding in Nova Scotia is proceeding rapidly under its own impetus, and the main efforts made by the provincial Department of Agriculture are in the direction of giving information in respect to insect and fungous pests, to the fertilization of orchards, and similar matters.

It is very satisfactory to be in a position to write so optimistically of fruit growing in Nova Scotia, and it is only necessary to explain that the occasion of this is the favourable climatic conditions and the particularly favourable transportation facilities in respect to which no other part of America possesses greater natural advantages.

CO-OPERATIVE EXPERIMENTS IN GROWING CROPS FOR FORAGE IN SASKATCHEWAN

BY W. A. MACLEOD, EDITOR OF PUBLICATIONS

CARRYING out one of the recommendations of the Better Farming Commission, a series of co-operative experiments will be undertaken this year in Saskatchewan in the growing of crops for forage, in addition to the standing field crop competitions and seed drilling competitions inaugurated several years ago. These experiments in the growing of forage crops will take the form of competitions carried out under the auspices of the Agricultural Societies of the province, assisted by the Agricultural Extension and the Field Husbandry departments of the provincial College of Agriculture, and the provincial department of agriculture.

In the competition in growing crops for forage, a grant equal to 50 per cent of the prize money paid out, but not exceeding \$75 may be earned by chartered agricultural societies. The competition is limited to the following crops:

Sweet clover, Grimm alfalfa in rows, brome grass, western rye grass, corn in rows for forage to be used as a substitute for summerfallow, sunflowers in rows for silage.

The first four crops being either biennial or perennial cannot be satisfactorily judged until the second year so that in order to get the competition under way it is suggested that either corn or sunflowers or both should be selected for the competition this year and other crops chosen from the first four mentioned and seeded this spring to be ready for judging in 1922. As sunflowers can only be fed profitably as silage, only farmers who have silos or are preparing to build them should raise sunflowers for forage.

The size of the field must be at least two acres for all these forage crop competition, and where the area of the field

entered is over the minimum required, the whole field will be scored and prizes awarded accordingly.

As the purpose for which these competitions are being held is to have as many farmers as possible in all parts of the province co-operate in friendly trials for growing better crops, the terms of the competition are such that farmers anywhere may engage in one or more of these practical demonstrations of better farming.

For the summer of 1921 the Standing Crop Competition will be conducted on a basis subject to a regulation of the Dominion Seed Commissioner.

The Summerfallow and Seed Drilling Competitions are closely allied to the Standing Crop Competition and may very profitably be held in conjunction with it. Similar rules to those suggested for the crop competitions may also be adopted for them. Grants equal to 50 per cent of the prize money paid out, up to the maximum of \$50, may be earned by chartered agricultural societies for both summerfallow and seed drilling competitions.

By holding summerfallow competitions in conjunction with field crop competitions, the field crop judge can make the awards in both competitions during one visit. The two competitions are related in that there must be a well prepared seed bed before a clean, even stand of grain can be expected. This competition should develop interest in the control of weeds—one of the chief uses of the summerfallow. It is suggested that fields of summerfallow entered for competition be 25 acres. Otherwise the same rules as for the standing crop competition should govern.

A few societies held seed drilling competitions last year and they have been found very useful in developing among other things a pride in good workman-

ship. It is suggested that fields entered be at least 25 acres. Awards for this competition may be made by a committee of local judges.

CO-OPERATIVE MARKETING OF FRUITS AND VEGETABLES IN BRITISH COLUMBIA

BY J. A. GRANT, MARKETS COMMISSIONER

THE co-operative marketing of fruit and vegetables originating in British Columbia is at present in a transitory state. The fruit and vegetable growers are almost all organized in local associations. Some are organized to sell and to buy for their members. Some of the organizations have been selling co-operatively for years.

Within the past few years fruit and vegetable production in British Columbia has far exceeded the provincial needs and inter-provincial and export markets were exploited. The efforts of the locals in selling to outside markets were unsatisfactory. Internal competition existed and no definite standard, grade or price was maintained. Two years ago all the shipping organizations formed what is known as the "British Columbia Traffic and Credit Association," and the meeting together of shippers has been a factor in regulating shipping methods and establishing a standard to meet all competitors, all the important shippers belong to this association including the Okanagan United Growers.

The Okanagan United Growers control their own selling agencies which have become the price setting factor in British Columbia during the past two years, their locals grow and ship through them, the bulk of the tonnage originating in the Okanagan valley. In addition to this tonnage, their Sales Agencies will sell 90 per cent of all the berries rolling from British Columbia this year. It looks as if "Sales Agencies" controlled by the growers will be the dominating

factor in this year's distribution of fruit and vegetables in outside markets as far as British Columbia is concerned.

Co-operative marketing in British Columbia is fast approaching the ideal state which is to approach outside markets as a unit, distributing through a central brokerage or selling agency, by insisting that home produce is of equal standard, grade and price to that quoted by competitors, and if necessary to shade the price. By this means all outside competition may be successfully met.

The Government of British Columbia has assisted the co-ordination of locals by loans and otherwise. They maintain a staff of expert horticulturists for practical demonstration and educational purposes and are the only Provincial Government in Canada maintaining a markets branch. The chief activities of the markets branch is to study the market needs, report on conditions of arrival at destination, extend the markets as conditions arise to make it necessary, also to issue a weekly bulletin during the shipping season featuring competitive quotations, f.o.b. shipping point and wholesale prices current at principal distributing points and generally to represent the absentee shipper. In carrying on this work it has been found that only by co-ordinating the various locals can successful marketing be accomplished.

Both the provincial and Dominion officials have co-operated with the organization movement in helping to establish standards of produce that are not only

in compliance with the Dominion law, but equal to competitive standards. It is too early to report on what the results will be, but it is likely that the success met with by California producers, may be anticipated. Oregon and Washington producers are at present organizing to market their produce as a state unit,

and as our chief competition comes from these points it would not be wise for British Columbia to be behind them.

British Columbia would welcome the other provinces of the Dominion joining with them in a movement towards preservation of the Canadian markets for Canadian producers in their season.

CO-OPERATIVE MARKETING OF LIVE STOCK IN PRESCOTT AND RUSSELL COUNTIES, ONTARIO

BY FERDINAND LAROSE, L.P.H., B.S.A., AGRICULTURAL REPRESENTATIVE

THERE are altogether 44 local Farmers Co-operative Associations in Prescott and Russell counties, in the province of Ontario, all of which have been organized within the last three years with a special charter. Although some of them are rather slow in developing a satisfactory amount of business, most of them are doing very well. The bulk of business through these clubs has been done in selling live stock. For instance out of \$141,618 of business done by eighteen clubs in Prescott county during 1920, \$81,649 was done through selling live stock and eggs, as compared with \$59,968 for the purchase of groceries, feeds, twine, etc.

It has not been an easy task to get the farmers to sell co-operatively, and to gather enough animals on a set date to ship a car load. The officers of the clubs, especially the secretaries, had a heavy burden in taking the responsibility of the shipment. However, farmers soon realized the benefit of co-operation and are now beginning to put forth spontaneous efforts to lighten the burden of the officers.

Different methods were used in gathering live stock and loading cars. If at one of the meetings of the club enough members were willing to ship, a date was set and a man appointed to take care of the shipment during the trip to the live

stock yard. This man was paid his expenses. Another was allowed \$3 to prepare the car while a third was given \$2 to look after the marketing of the stock, which was done the day of the shipment at the station. Roman figures are scissored on the left hip for cattle, and ear tags are put on both ears for swine and sheep. The returns are made to the secretary, who looks after the distribution of the money to each individual shipper.

The St. Isidore Club tried another system, which proved to be very satisfactory, and will probably be adopted by the other clubs in the near future. The secretary is given a flat commission of 1 per cent, and has to look after all the details of the shipment. Every week he pays a visit to the members, looking over what they expect to sell, advising them as to the needs of the market. He makes it his duty to see that every member ships under the very best conditions so as to get the highest returns. This is a direct fight against the local drover and has given very good results. Each member is kept in touch with the market and the secretary, continuously studying the conditions of the market, becomes a specialist in the matter.

All the farm produce shipped through these clubs is sold on a graded basis,

either through the United Farmers of Ontario or the Quebec Central Farmers' Co-operative Association.

Selling co-operatively has developed a keen competition with the local buyers, but we hope that, in the near future, every farmer and the people at large

will understand the aim of co-operation, which is not to do any harm to anybody, but to improve the quality of farm produce by inducing the producers to put on the market a better class of goods.

CONTAGIOUS ABORTION TEST

Saskatchewan Makes Provision for Free Testing to Determine the Presence of the Disease

BY W. A. MACLEOD, EDITOR OF PUBLICATIONS

THE Hon. C. M. Hamilton, provincial minister of agriculture, announces that arrangements have been completed with the University of Saskatchewan at Saskatoon to make blood tests for contagious abortion, which will greatly assist farmers in the province in determining at any time whether there are in their herds any animals affected with this disease. Contagious abortion is now prevalent in every country where cattle raising is an industry and is claimed by some authorities to be second only to tuberculosis in destructiveness, and every effort will be made to keep Saskatchewan herds as free as possible from loss from this source.

Through the assistance of the local veterinary surgeon, samples of blood from each of the cows to be tested may be sent to the Veterinarian, Pathological Laboratory, University of Saskatchewan, where the samples will be tested

for the disease and a report forwarded to the local veterinarian. The process by which the samples are tested is exceedingly delicate but very accurate, and is of great value in locating infected cows in a herd, where clinical examination would be of little value. There will be no charge made at the university for this work, the only expense being the charge of the local veterinarian who collects the blood samples, as this is an operation that requires trained skill and could not be properly done by the farmer himself.

Under this plan of testing it is possible to detect and isolate an infected cow before the whole herd is infected, and avoid the heavy loss which would thus be incurred.

A circular describing the disease and suggesting precautionary measures is being published by the provincial department of agriculture.

GRASSHOPPER CAMPAIGN, SASKATCHEWAN

Preparations Being Made on a Large Scale for a Possible Outbreak in 1921

BY W. A. MACLEOD, EDITOR OF PUBLICATIONS

THERE is every likelihood of a grasshopper outbreak in 1921, and it is liable to prove more serious in districts where the insects were reported in 1920 for the first time than in areas where they have been prevalent for a longer period. Complete organization is now being effected to cope with the situation.

The organization plan worked out by the Provincial Department of Agriculture early in the spring of last year was based upon securing the whole-hearted co-operation of the officials of the rural municipalities where outbreaks were expected. Without this co-operation the campaign would have been hopeless. I am glad to say that the splendid support shown by our municipal officials and by the people of our villages and towns as well as of our rural municipalities gave very favourable results, but we must not relax our vigilance even if we allow ourselves to hope that the grasshopper outbreaks may not be as serious in 1921.

Organization is now under way for the 1921 campaign and the Department of Agriculture has on hand a supply of materials required for preparing poison bait and has made contracts for further deliveries when required. These supplies are to be furnished at half cost to rural municipalities as in 1920.

Such good results were secured from the form of organization adopted last year, that this will be continued. The Department of Agriculture had general charge of the whole campaign, purchased and distributed the material for making the poison bait, and supplied field directors, one for every four municipalities in infested areas, and the municipalities co-operated by appointing municipal captains for each municipality, and under this captain a complete organization for mixing and distributing the

poison was effected, even the school children giving excellent service as scouts to locate and report outbreaks. A month ahead of the date when it was expected the grasshoppers would hatch, field directors were on the ground to mobilize local municipal companies of the Hopper Brigade and discuss organization plans with the municipal officers.

Supplies for poison bait were purchased on a large scale by the department and stored at central points in infested areas before the grasshoppers began to appear so that there would be no injurious delay. The total supplies furnished to municipalities for the whole season amounted to 2,720 tons of bran, 225 tons sawdust, 112,636 gallons of molasses, 2,805 cases of lemons, 166 tons of arsenic, 34 tons of paris green, and a barrel of amyl acetate, the total cost, including incoming and outgoing freight and express charges, amounting to \$337,820.19. Altogether 7,200 tons of bait were spread in 1920. As the supplies were secured at wholesale prices, the saving to the municipalities was very large.

Reports received in response to a questionnaire sent to each of the secretaries shows a crop saving which at first glance appears hardly credible, even in the face of the fact that the district infested by hoppers included that part of the province with the greatest percentage of land under crop and involved 97 municipalities or almost one-third of all Saskatchewan municipalities. The crop saving of 1,400,000 acres which is the estimate submitted by the various secretaries, would be about a tenth of the total acreage of the province. The money value of the crop saved, after making all allowances for light yields, destruction by hail, drouth loss, etc., would be very great, and the figures given reach such a high

total, exceeding twenty millions of dollars that we hesitate to submit them as the official estimate.

The danger of unpreparedness is greatest in the newly infested districts. Those who have had experience know the danger and require no urging to

meet it, but farmers who have had no experience with grasshoppers and do not realize to what extent they can destroy crops are the hardest to convince that definite and adequate preparations should be made to destroy them.

GRASSHOPPER CAMPAIGN, ALBERTA

FOLLOWING the co-operative action of the Prairie provinces and the Dominion in the work of the Weed Special Train in the early part of the winter, the Department of Agriculture for Alberta is preparing to actively combat the grasshopper pest this year.

The organization represented in the Provincial Agricultural Schools is proving highly useful for different kinds of extension and emergency work. The teaching term closes at the end of March, which gives them the whole crop season for other kinds of work such as fairs, home gardens, and the various agricultural problems which confront the farmer from time to time. The acquaintance of the staff with a large constituency through the school fairs, makes it easy for them to do such other work as comes to the district representative. This year the "hopper" trouble will be taken care of almost entirely by the men from the Schools of Agriculture. The Game Guardian's Branch is procuring the supplies of poison, and will look after its wholesale distribution. Poison will be held in quantities at Edmonton, Calgary and Lethbridge and also at the schools. Application for assistance

from individuals, farmers' associations or municipalities will be sent to the schools. Poison will be furnished at cost for cash f.o.b. point of shipment.

In the areas where municipalities are established, the municipalities will look after the actual work required to combat the pest, but will operate with the assistance and direction of the experts from the schools. In the unorganized districts the work will be handled through the schools, but it is expected that the local organization for giving effect to the work will be in most cases the United Farmers' associations. The areas in which this work is at present contemplated are the districts tributary to the six schools, namely, Raymond, Claresholm, Gleichen, Youngstown, Olds and Vermilion.

The Dominion Department of Agriculture will co-operate with the provincial officials. Mr. Strickland, of the Lethbridge Experimental Farm, will visit the schools and will attend such meetings as are called when difficulties arise in different areas. There are twenty-five men now ready for the work and more will be put on if necessary.

DAIRY HERD COMPETITION IN SASKATCHEWAN

Results of the Greater Average Production Competition in 1920

BY P. E. REED, DAIRY COMMISSIONER

THE cow testing work in the province has been carried on by the Dairy Division of the Dominion Department of Agriculture under the direct supervision of C. E. Thomas, Dairy Promoter for Saskatchewan. Cow testing centres have been organized at twenty-one points in the province, and of these, Saskatoon centre has to date the largest number of cows under test. In addition to these centres, work has been carried on periodically at many other points. The financial value of regular testing is becoming better appreciated from year to year and there has been a consequent steady increase in the work.

The Greater Average Production competition has been an important factor in stimulating interest in this work. This competition is conducted under the auspices of the Saskatchewan Dairy Association in conjunction with the Dairy Branch of the provincial Department of Agriculture. The competition has now been held for three years and the results have demonstrated its value. In 1920, the competition had become so popular and had aroused such general interest that it was decided to confine it to herds that were actually under regular test with the Department of Agriculture.

Complete reports were furnished by competitors covering the production of 75 herds, entries coming from all parts of the province,—from Prince Albert and Birch Hills in the north to Woodsworth and Kingsford in the south, and from Langenburg on the Manitoba

boundary to Lloydminster on the Alberta boundary. A much larger number of herds entered but only those furnishing complete official records were considered in making the awards.

The regulations governing the 1920 competition specified that prizes were to be awarded to the owners or proprietors of herds of five or more cows on the basis of the average butter fat production of whole herds for the twelve months ending December 31, 1920. Competitors were required to keep a record, for at least six months of the year, of the production of their herd, in conformity with the rules as laid down in the system in use by the Dairy Division, Ottawa.

The rapid improvement of dairy herds that follows systematic testing of individual cows in a herd is well illustrated by the fact that in this competition six of the eight prizes were won by herds owned by members of the Saskatoon Co-operative Milk and Cream Producers' Association, in a district where systematic testing has been carried out for several years.

The competition has been made possible through the liberality of three firms who have contributed the prize money each year. The 1920 contributions were: Robert Simpson Co., Ltd., Regina, \$50; T. Eaton Co., Saskatoon and T. Eaton Co., Regina, \$50; P. Burns Co., Regina, \$25. It is hoped that the competition will be continued and extended during the current year.

THE POULTRY WORK OF THE NEW BRUNSWICK DEPARTMENT OF AGRICULTURE

BY M. A. MACLEOD, SUPERINTENDENT OF AGRICULTURAL SOCIETIES

THE New Brunswick Department of Agriculture is without a superintendent of poultry husbandry at the present time, Mr. McCulloch, who had charge of the Division for the last three years, having severed his connection with the Department. His successor will be Mr. F. L. Wood, who was Mr. McCulloch's assistant last year, and who is completing his course at the Ontario Agricultural College, Guelph.

The early hatching of chicks, an improvement in the feed situation, the organization of Boys' and Girls' poultry clubs, distribution of eggs and day-old chicks, importation of turkey eggs, culling demonstrations and the publication of a bulletin thereon, demonstrations at fall fairs, an active interest in the work of the Maritime Poultry Association and the participation in the Egg Laying Contest at Nappan marked the most important lines of Mr. McCulloch's work, together with personal visits to advise farmers on poultry questions.

During the past year, particular stress was laid on breeding for utility purposes rather than for show. How well the Division succeeded in this respect is reflected by the success of New Brunswick birds in the Egg Laying Contests. In the contest at Charlottetown in 1918-19 New Brunswick birds were highly successful, winning first, third and sixth places in point of total eggs laid. This success whetted the appetites of New Brunswick breeders for more records, and consequently eight breeders had entries at the Nappan contest in 1919-20 in competition with nine pens from Nova Scotia, two from Ontario and one from Quebec. Seven of the eight pens from New Brunswick were of Barred Plymouth Rocks. Six of these were of a strain imported by the Provincial Poultry Division. The eighth entry from New Brunswick consisted of White Leghorns, the pen that carried off second place

honours. The standing of the eight pens were: First, second, third, fourth, fifth, seventh, eleventh and sixteenth. Aside from this conclusive proof of the high egg-producing capacity of our stock, the following facts may be of interest:—

The total production of the eight New Brunswick pens for the first six months, including the winter period, was 4,872 eggs or 60.9 eggs per bird. The total production of the twelve pens from the other provinces for the same period was 4,815 eggs, or 40.1 eggs per bird. The total production of the eight New Brunswick pens was 11,194 eggs and of the other twelve pens 13,032 eggs. The average production per bird of the New Brunswick birds was 139.9 eggs and of those of the other provinces 108.6 eggs. The average year's production for the hens on New Brunswick farms is approximately six dozen (72) eggs, or just about one-half the number produced by our birds in the contest and a little more than the number these birds produced in the first half of the year.

This splendid showing warranted the organization of an Egg Laying Contest under the auspices of the Federal Poultry Division on the Experimental Farm at Fredericton, and at which there are now no fewer than sixteen breeders of Barred Rocks, three breeders of White Wyandottes, one of Buff Orpingtons, one of White Rocks, and one of White Leghorns from New Brunswick. This contest started November 1, 1920, and continues for 52 weeks. The latest report, week ending March 27, the best individual record for the week is 7 eggs, the best pen (10 birds) record for the week 49 eggs, and the best pen record from November 1 to date, 712 eggs. The total number of eggs laid by the 21 pens for the week is 745 eggs, and the total number from the time the contest started, to date, 10,036 eggs.

AGRICULTURAL REPRESENTATIVE SERVICE IN MANITOBA

BY N. C. MACRAY DIRECTOR AGRICULTURAL REPRESENTATIVES

THE first Agricultural Representative was appointed in Manitoba in April, 1915, but on account of the scarcity of qualified men, due to war and other conditions, the growth of the system has been slow. Five offices are now open, and several more will be established this year.

A brief outline of a few of the projects undertaken is here given

Field Crop Improvement Representatives devote a great deal of time to the improvement of field crops. One Representative in 1920 was instrumental in securing 8,000 bushels of good seed grain for farmers in his district; another had 427 farmers test out potatoes of an improved standard variety.

Boys' and Girls' Club Work.—The Boys' and Girls' Club Work has received a great deal of attention. All the Representatives work in close co-operation with the club leaders, school inspectors and others. Gardening clubs, calf clubs, sheep clubs, etc., have been organized and much of the work already undertaken has been standardized and systematized.

Seed.—Seed of crops not generally grown, such as sugar beets, hemp, sweet clover, etc., has been brought in and farmers have been organized for the purpose of experimenting with these.

Live Stock.—Live stock breeders' associations, live stock sales, sheep clubs, calf clubs, etc., have been organized in many centres; assistance has also been given the farmers in purchasing improved live stock. One Agricultural Representative was instrumental in introducing twenty head of pure-bred cattle, while others have specialized in hogs and sheep.

Poultry Work.—Poultry raising has been encouraged in the various districts.

Seventeen culling demonstrations were held in two districts in the summer of 1920.

Agricultural Societies and Kindred Organizations.—Representatives have always co-operated with the various agricultural organizations in their districts. Four agricultural societies have had representatives as secretaries. They have all judged at Agricultural Society fairs, Boys' and Girls' Club fairs, etc. They have acted as secretaries of Rural Credit Societies, have conducted Farm Labour Bureaus, as well as being members of the boards of practically every society in the district.

Co-operative Buying—Co-operative marketing and business practices have ever been emphasized by the representatives, but they themselves have not acted as managers, but rather as advisors. In one small district where the farmers were properly organized they were able to save \$1,320 on one single car of produce that they imported.

The Department of Agriculture provides from the Dominion Agricultural instruction grant the greater part of the salary of the Representative, travelling expenses and mileage for his car when on official business. The municipality is responsible for the office and its equipment, a stenographer and funds for the carrying on of the various projects.

It is impossible here to outline in detail every activity undertaken by the representative, but his watchword has ever been "Service to every one in the community." His efforts have been to so organize his people that they will assist themselves, rather than wait for him to do so for them.

THE FEDERATED WOMEN'S INSTITUTES OF CANADA

BY ELIZABETH BAILEY PRICE

THE holding of the National Convention of the Federated Women's Institutes at Calgary from June 20 to 25, focuses the public eye on the Women's Institute, an organization which originated a good many years ago in the older provinces of Canada. In 1919 the Women's Institutes were federated, forming an organization of nearly a hundred thousand women. As a result, many people are asking—What are these women's institutes? What is their work, and what have they accomplished?

Work and Aims

Their purpose is primarily to better home conditions in rural communities, and to bring to the farmer's wife all necessary information regarding her home and its activities. In the years of their existence the scope of the institutes has widened and now includes such activities as providing scholarships in the agricultural colleges for boys and girls of the community, the formation of boys' and girls' clubs to increase the interest and liking of young people for rural life; the study of laws protecting women and children; conducting campaigns for child welfare and better nursing facilities in isolated districts (particularly in pre-natal and maternity work); the Canadianization of our new citizens; the opening of rest rooms in villages, towns and on fair grounds for the use of farmers' wives and children; installing of libraries in these rest rooms, instigating community singing and other social interests, using the rest room as a community centre; bringing to women in isolated districts wider vision by contact with other groups of women, a linking up of the women of the villages and towns and cities in any effort to better the community.

War Activities

During the war the Women's Institutes in the different provinces were used

to facilitate food control, conservation and greater production. In many provinces the Red Cross activities in the rural districts were in the beginning conducted wholly through the women's institutes. In Ontario alone they raised four million dollars in money and goods for war work. In several provinces they assisted greatly in re-patriation of soldier's dependents, meeting them when they arrived in the villages and helping to get them settled. They are at present co-operating with the Home Branch of the Soldier Settlement Board in assisting the wives of soldiers who have settled on the land. They are co-operating also with the Canadian Council of Immigration for Household Service in assisting old country girls who may come to seek employment in farm homes.

Ontario was the first province to have women's institutes, the first one being organized some forty years ago. Within the last decade other provinces have followed and these clubs are in existence under the various names of Home Economics Clubs, Home Makers' Clubs, Women's Institutes and the Cercles de Fermieres of Quebec.

The work in each province is directed by a superintendent, who is an officer of the provincial department of agriculture. Under this officer is usually a corps of women known as lecturers or demonstrators in cooking, home nursing, sewing and millinery. The local institutes are financed through grants made by the provincial governments and by the provincial departments either from their own funds or from the federal grant made under the provisions of the Agricultural Instruction Act.

National Federation Formed

In order that the splendid work of the women's institutes in the different provinces should be co-ordinated, standardized and brought to its greatest usefulness, it was felt that a national federa-

tion should be formed. This was done at a meeting held in Winnipeg two years ago, when representatives of each province were present. The following objects were embodied in the constitution:—

1. To co-ordinate the various provincial women's institutes;
2. To act as a clearing house for the activities of the various federated organizations;
3. To raise the standard of home making;
4. To develop agriculture;
5. To promote educational, moral, social, and economic measures;
6. To encourage co-operation and community efforts;
7. To initiate nation-wide campaigns in accordance with the objects of the Federation.

This organization takes no part in political propaganda, being strictly non-partisan and non-sectarian. This is a point that has raised a good deal of discussion, it being claimed that the Women's Institutes being non-political could not approach their political representatives and urge the passing of progressive laws. But, like the word "patriotism" the word "political" has been corrupted to have a very narrow meaning. In the broad sense of the word, it means anything "pertaining to promote the welfare of the state," and in this women's institutes can and do take part. Sectarianism, too, is barred—that is the discussion of it in meetings—as it is felt there is greater unity and harmony and greater strength if religious differences are not introduced.

The constitution is very broad. It can be suspended at any time, which permits the institute to "carry on" and take immediate action on current problems.

Conventions are held alternately East and West, and the executives, which are elected in biennial conventions, alternate between East and West. The work is divided among committees these be-

ing agriculture, laws, child welfare and public health, home economics, education and better schools, immigration, institute technique, national events, and publicity. The following officers at the helm are: Honorary Presidents, Mrs. Arthur Meighen, "Glensmere," Ottawa, Ont.; Mrs. E. C. Drury, Toronto, Ont.; Mrs. R. B. Brett, Government House, Edmonton, Alta.; Lady Aikins, Government House, Winnipeg, Man.; Mrs. W. Pugsley, Government House, Rothesay, N.B.; Lady Fitzpatrick, Government House, Quebec, P. Q.; Lady Barnard, Government House, Victoria, B.C.; Lady Lake, Government House, Regina, Sask.; Mrs. MacC. Grant, Government House, Halifax, N.S. President, Mrs. Emily F. Murphy, Edmonton, Alta.; Vice Presidents, Mrs. William Todd, Orillia, Ont.; Mrs. J. P. Gamache, Pont Rouge, P.Q. Hon. Corresponding Secretary, Mrs. A. H. Rogers, Fort Saskatchewan, Alta. Publicity Convener, Mrs. J. F. Price, Calgary, Alta. Treasurer, Miss Eliza Campbell, Fredericton, N.B. Convener on Agriculture, Mrs. Laura Stephens, Huntingdon, P.Q. Convener on Laws, Hon. Mary Smith, M.P.P., Victoria, B.C. Convener on Health and Child Welfare, Dr. Margaret Patterson, Toronto, Ont. Convener on Education and Better Schools, George A. Putnam, Esq., Toronto, Ont. Convener on Home Economics, Mrs. W. W. Baird, Nappan, N.B. Convener on Immigration, Mrs. Chas. Robson, Winnipeg, Man. Convener on Institute Technique and National Events Committee, Mrs. Alfred Watt, M.A., M.B.E., Victoria, B.C. Ex-officio Member of the Board of Directors, The Superintendent of Women's Institutes for each province, namely, Ontario, Mr. George A. Putnam; Nova Scotia, Miss Helen MacDougall; New Brunswick, Miss Hazel McCain; Quebec, Miss Roach; Manitoba, Mr. S. T. Newton; Saskatchewan, Miss Abbie DeLury, Alberta, Miss Mary MacIsaac, and British Columbia, Dr. Warnock.

THE INTERPROVINCIAL WEED SPECIAL IN MANITOBA, SASKATCHEWAN AND ALBERTA

WHEN delegates from the Departments of Agriculture of the provinces of Manitoba, Saskatchewan and Alberta met in conference early in the winter, to talk over the various agricultural problems common to the three provinces, it was unanimously agreed that the loss from weeds far outweighed the loss from any other preventable cause. This fact led to the

and indicated its willingness to supply a train for six weeks—two weeks in each province.

The Deputy Ministers of Agriculture for Manitoba, Saskatchewan and Alberta, were requested to take in hand the matter of completing the arrangements.

It was agreed that at least one representative from each province was to be



CLASS OF SCHOOL PUPILS VISITING THE INTERPROVINCIAL WEED SPECIAL TRAIN.
IN MOST PLACES THE SCHOOL AUDIENCES WERE MUCH MORE UNIFORM,
BEING MAINLY HIGH SCHOOL PUPILS

decision that if the Canadian Pacific Railway would co-operate to the extent of providing the service, a special inter-provincial train on weed control should be equipped and sent out. The Canadian Pacific Railway was chosen because it possessed a good network of lines in the southern part of the three provinces where it was believed that this work would be most helpful. The Canadian Pacific Railway concurred in the plan

on the train at all times, and that the completion of the staff should be in the hands of the department for the province that was being toured.

The train was fitted up in Winnipeg and included two lecture cars, an exhibit car, a car for the display of farm implements, and a dining-sleeping car. On the walls of the two lecture cars were displayed placards bearing on the weed

question. In the exhibit car drawings were displayed, and living and pressed plants illustrating the worst weeds were exhibited, accompanied by cards indicating the means of eradication of each kind of weed. Many kinds of weed seeds were shown under magnifying glasses; also models of weed seeds enlarged to 40 diameters. The exhibit included soil plots to represent fields infested with certain weeds, and with each was shown the type of implement recommended for the eradication of this particular weed.

The train began its work in Manitoba on January 24 and ended in Alberta six weeks later. Favourable weather was experienced throughout the trip, and with one exception all advertised meetings were held. When the train started, it was not intended to offer any addresses to school children, but the appearance of large groups of pupils at each successive point visited, soon indicated the wisdom of encouraging and directing such visits, and after the first two days, definite approaches were made to the schools so as to secure pupils of the higher grades. A different type of lecture was provided for the pupils than for the farmers, the pupils' talk being more in the form of

nature study, while the talks to farmers dealt with the control of specific weeds, the enforcement of the Weeds Act, and improved farming methods.

The total attendance in the six weeks was 14,000 persons. Though extra seating was provided, the cars were unable to accommodate the attendance at many places, and at two or three points, halls were engaged to take care of the overflow.

The best possible speakers were provided in each province; and the discussions, though mainly concentrated on the weed question, necessarily covered a considerable breadth of ground. The Dominion Experimental Farms staff was represented; also the Agricultural Colleges and the Departments of Agriculture. The Weed Special was operated as an attempt to give an educational service, and to obtain, if possible, a better understanding of the very difficult task of weed control, which concerns not only municipalities and governments, but, much more, the individual farmer.

The message was very heartily received, and the sympathetic attitude of the audience was an encouraging feature of the whole campaign.

BETTER BULL CAMPAIGN FOR SASKATCHEWAN

BY W. A. MACLEOD, EDITOR OF PUBLICATIONS

THE Provincial Department of Agriculture, with the co-operation and support of the Saskatchewan Cattle Breeders' Association and the various cattle clubs of the province, is inaugurating a "Better Bull" campaign for the elimination of scrub bulls and the general improvement of sires used in the herds of the province. The campaign will continue for two or possibly three years, and will be directed through the live stock branch of the department.

It is estimated that Saskatchewan's share of the total annual loss by the cattle

men of Canada of approximately \$23,000,000, due to the use of scrub and inferior bulls and lack of finish in feeding, would amount to over \$3,000,000 per annum at the lowest figure, and any material improvement in the standard of the cattle raised in the province through the use of better sires, would directly benefit the farmers to the extent of at least a million dollars a year and would indirectly be of the greatest service to the entire province.

Stock yards statistics show that of the cattle shipped for slaughter in 1919,

340,000 head of cattle, or 48 per cent, were graded as "Common."

For a number of years the various Live Stock Associations, such as the Cattle Breeders' Association, the Stock Growers' Association and the Dominion and provincial departments of agriculture have been advocating and encourag-

ing the keeping of better bulls and the elimination of scrubs, but while much has been accomplished in raising the standard of live stock, it is felt that the whole future of the industry in this province depends upon a general improvement in the breeding of both beef cattle and dairy herds.

SHORT COURSES AT MONCTON, N.B.

BY J. H. KING, AGRICULTURAL REPRESENTATIVE

A two weeks' Short Course was held at Moncton commencing February 21 and ending March 5. Nearly twice as many students were in daily attendance as there were at a similar course held last year. In all 38 boys and young men were enrolled; 17 attended for the full course, 13 for one week or over and 8 for less than one week. Besides the regular students, each day saw one or more visitors come in for a lecture or lectures relating to some phases of agricultural work in which they were particularly interested.

Care was taken to have the course deal largely with farming problems of special interest to the farmers in this section of the province which includes a study of the breeding of farm stock, feeds and feeding, milk testing, soil cultivation, crop production, fertilizers, marketing of stock and poultry products, etc. The lectures were illustrated with motion pictures and lantern slides as much as possible. Practice in stock and seed grain judging and demonstrations in milk testing were given. Every effort was made to make the course interesting as well as instructive.

That the course was successful, there could not be any doubt. Not only was the attendance between 75 per cent and

100 per cent greater than that of last year, but the boys were a bright lot and were "workers." Many stated to the writer that they enjoyed the whole programme and not only would they attend another year if an opportunity was afforded them for doing so, but would induce others to come as well. The two weeks' vacation from the daily chores on the farm and the mixing of the boys from the various districts of the province with one another, were very significant features, and must not be overlooked when considering the benefits to be derived from the course.

Two prizes were offered to those making highest marks as the result of an oral examination held at the end of the course as well as two prizes for the best essay to be handed in 10 days later on "How to build up a good dairy herd." This tended to make for greater interest on the part of the best students at least.

While this course was under the direction of the writer, he was ably assisted by other members of the Provincial Department of Agriculture and by various members of the Dominion Department of Agriculture in New Brunswick.

DEMONSTRATION IN THE GRADING OF BEEF CATTLE

A DEMONSTRATION in cattle-grading for the information of farmers selling beef animals was organized recently in Simcoe county, Ontario, by the Agricultural Representative, Mr. A. Hutchinson. This was the first demonstration of its kind held in Ontario, and was conceived with the idea of explaining to farmers the system of valuation arrived at by buyers and commission men when the stock reached the market. Mr. Hutchinson, who contributes the following particulars relating to the demonstration, says that, although co-operative shipping of live stock is extensive in Simcoe county, and is efficiently handled, nevertheless, most farmers overrate their cattle, and when the returns are received they are disappointed at the size of their cheque and blame every one but the right person—namely, themselves. This causes a certain amount of adverse criticism against co-operative work and creates a feeling of dissatisfaction with the method of shipping.

Many farmers have no opportunity to visit a large stock market, and probably would not if they could; but when the actual transaction was brought to their door, with actual buyers and sellers on hand, they ploughed through the mud and braved the rain and cold to get satisfaction and knowledge on this particular phase of their business.

We endeavoured, states Mr. Hutchinson, to secure as many different grades of cattle as possible, from the lowest to the highest, and collected these at a convenient centre. Mr. Charles McCurdy, head of the U.F.O. Live Stock Commission, explained the different grades and trade requirements of the Toronto market, using the cattle present to point his remarks. Mr. Wilson, the abattoir buyer, gave the present market prices of the various grades of stock present, their weights and killing percentages, judging from appearance. A bombardment of questions was hurled at the demonstrators for two hours, and many argued points were settled for good, insofar as that particular district was concerned.

The net result of the afternoon's work was that some fifty farmers near Elmvalle learned that their grading and that of the Toronto market had totally different results. They also learned what the buyers wanted and something of their problems. Many incidental points were fully explained, such as undue shrinkage, causes of good and poor markets, and some of the reasons for loss from both the farmers' and the buyers' standpoint. All the various points were brought out by having on hand live animals of many types upon which to demonstrate.

"If it were not for Canada's climate, we would not be producing the finest milling wheat in the world; the primest of beef cattle; the growing output of lumber and furs; and the fine, vigorous race of young men and women that so cheerfully demonstrated, in the recent Armageddon, its ability to endure and accomplish."—Agricultural and Industrial Progress in Canada.

PART III

School Agriculture and Related Activities

SUCCESS WITH BOYS' AND GIRLS' CLUBS AND SCHOOL FAIRS

A Number of Workers Prominent in this Field of Endeavour Describe the Way to Achieve the Best Results

ONTARIO SCHOOL FAIR METHODS DESCRIBED

J. H. CARROLL, AGRICULTURAL REPRESENTATIVE, PEEL COUNTY

ORGANIZATION is the first essential of a successful School Fair coupled with maximum personal supervision on the part of Agricultural Representative. The scholars, teachers and parents must be encouraged to carry the responsibility, but an overseer should visit as many schools as possible in order to explain any difficulties and arouse enthusiasm, particularly in the weak units.

Systematic promptness must be insisted upon and, above all, practised in the controlling office. If plans are prepared well in advance and all instructions and letters mailed early, much confusion and annoyance will be avoided. In Peel, the instructions and lists of seeds with trustee contract sheets and application forms are sent out about the middle of January. The teachers and secretaries are asked to make returns by February 20. This allows time to order and prepare seeds and smooth out difficulties well before the date set for distribution of supplies.

The supply of seeds and eggs should be sent out promptly, and be absolutely above suspicion as to quality. In order to do this, the seeds are ordered early and, all except potatoes, are packaged, labelled and grouped in "school sacks" in March. If any sort is found

below standard it can then be replaced and an extra supply ordered. Potatoes cannot be shipped from central storage until danger of frost is past, but these can be prepared quickly if all other supplies, except eggs, are off the tables. All seeds should be actually weighed, and all to a School Fair group sent out by the same mail or delivery.

To permit of eggs reaching the pupils as soon as possible after being laid and with a minimum of handling and shipping, breeding stations within the county are necessary. The three breeding flocks established in the county have produced about ten dozen a day this year, so that by starting to save eggs on March 25, we have all applications filled by April 20. The mails are satisfactory for delivery, as strong cartons are used and sawdust insures against breakage. By this method one is independent of unfavourable roads, which otherwise might delay despatch. Any breakages that occur are replaced.

To give the teachers and pupils a chance and encouragement to work throughout the season, the prize list ought to be in their hands in May. The prizes may be substantial, but honour should be premiumized and friendly pupil and school rivalry encouraged. In each of our groups in 1919, a shield was

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offered to the school winning most points per pupil on the roll. We also awarded a Certificate of Honour, signed by the Minister of Agriculture and the Agricultural Representative, to the high pupil in each school. In addition, book prizes were given for inter-school competitions. The greater interest shown and the increase in applications this season may be attributed to these "specials."

If the Agricultural Representative or an Assistant could judge all plots, the benefits of school fairs and home gardens would be increased by, at least, twenty-five per cent. As this is impossible with us at present, we endeavour to have the trustees appoint a local judge, and where such is secured in a section a prize is offered. There are always better cared for plots and a higher standard of exhibits in those sections where the plots are judged. Teachers and trustee boards are sometimes slack about securing anyone, so when possible we try to go out and organize the judging.

System at fair time is essential. If the dates are given in the prize lists very little other advertising will be necessary. Usually it is found that a letter of explanation or instruction is necessary in connection with special features, and the date, of course, would be mentioned in this.

A programme for fair day should be included in the prize lists, and followed closely. When planning this, the entertainment of anxious pupils and parents while the judging is being done must be arranged for. There should be no slack moments after the lunch hour until the halls are open to adults. Overcrowding and confusion may be avoided in the hall or tent by lining up all pupils and permitting them about 15 minutes to file through before admitting adults. The 1920 Peel programme was as follows:—

- 10.30 a.m.—All exhibits in place.
- 10.45 a.m.—Judging in hall begins.
- 11.30 a.m.—Lunch hour.

12.30 p.m.—Live Stock judging and Buttonhole competition.

1.00 p.m.—Contests.

2.00 p.m.—Hall open to children only.

2.15 p.m.—Hall open to adults only.

2.15 p.m.—Sports.

1.00 p.m.—Removal of Exhibits.

A sufficient staff of competent judges and helpers is necessary. Absolute justice, the basis of children's faith and affection, is only possible from those who know their work. We believe good judging to be a feature of school fairs in Ontario and largely responsible for their cumulative success.

Prize-paying to teachers by cheque offers a convenient means of straightening up on fair day. If all records are preserved, necessary corrections may be made afterward. As "system" is the key of success, a simple but efficient set of books must be carefully kept throughout the season. This will save endless confusion and inspire confidence.

A. P. Macvannel, Agricultural Representative, Prince Edward County

THE first School Fair in Prince Edward county was held in 1912 in Ameliasburg township. In 1914, fairs were organized in all townships of the county, and since that time have been held regularly. Although held in the same places and under the same conditions from year to year, the interest seemed greater in 1920 than in any previous year.

Tangible Results

I do not know of any one thing which is a greater factor in improving the farm production and farm industry of the county than the School Fairs. This influence has been felt for some time. This opinion is borne out by the annual report of Mr. J. E. Benson, formerly

Public School Inspector for the county, from which I quote the following:—

“The School Fair work has improved in efficiency. At first they were novel and it was feared that in a few years the interest and success might diminish; but instead they are now firmly established as a needed factor in the child life of our rural sections. The Fairs have been an unqualified success. In attendance, keen healthy competitions in exhibits and general interest they were very gratifying.

“The more tangible results of the last six years’ work are:—

“(1) The School Fairs have offered excellent opportunity for the Department to disseminate leading strains of the highest yielding varieties of grains, including O.A.C. No. 72 Oats and O.A.C. No. 21 Barley, distributed each year since 1912.

“(2) The people of the county have become familiar with the Marquis variety of spring wheat and Arthur peas.

“(3) Irish Cobbler and Green Mountain potatoes have been distributed successively for a number of years, and a large number of people have grown these varieties from seed obtained through the School Fairs. So far as potatoes are concerned, School Fairs are doing remarkable work in developing uniform marketable varieties.

“(4) Leading varieties of ensilage, flint, and Golden Bantam sweet corn have been regularly distributed, and are established as standards in Prince Edward county.

“(5) Barred Plymouth Rocks—utility—pure-bred strain, have become quite universal in the county as a result of the sittings of eggs distributed to the children for the past number of years. About 225 dozen eggs have been given out each year since 1914, averaging some 7 chicks per dozen each year.

“(6) On account of the quality of the vegetable seeds distributed, representing high quality varieties, the people of the

county have come to realize the importance and advantages of the gardens to supply the best varieties of vegetables.

“It is impossible to compute the money value which follows the introduction of these pure varieties of seeds and poultry. The parents and pupils are keen in saving these seeds from year to year, in order that they may be established as the only variety grown on the farm. The fine flocks of poultry on many farms is a tribute to the work of the School Fair.”

To quote further: “All this is of small value compared with the knowledge the pupils obtain through the medium of the competition. The what, how and why of all that pertains to the grain, poultry, potatoes and stock represents the true value of the School Fair to the child. These boys and girls will, as a result, make better and more intelligent farmers.”

In addition to bringing direct, practical results, School Fairs have had a very effective influence in encouraging the teachers of the county to take up the teaching of agriculture in the public schools. The number of schools receiving systematic instruction in agriculture has greatly increased, and it is the exception rather than the rule for a school not to study agriculture. Even the urban schools have teachers qualified for this work, and it is taught as a regular part of the school work. School gardens are conducted with a great many of the larger schools, and have been very successful.

Thus we see that the influence of the agricultural work in connection with the School Fairs has been most far-reaching and effective, and each year brings increased interest among the residents of the county.

How Conducted

* The method of procedure followed in organizing and conducting the Fairs is as follows:—

Early in the year an announcement of the conditions under which seeds

are to be given to the pupils, conditions governing the distribution of eggs, rules and regulations, and a suggested Prize List, are sent to the schools.

The crops from which pupils made their selection were the same for all the townships, and included the following:—

Oats, Barley, Wheat, Field Peas, Garden Peas, Potatoes, Irish Cobbler and Green Mountain, Field Corn, Flint Corn, Sweet Corn, Mangels, Turnips, Beets, Carrots, Onions, Parsnips, Asparagus, Sweet Peas, Phlox.

In the suggested Prize List sent out additional classes were provided for Eggs, Live Stock, Poultry, Weed and Seed Collections, a number of varieties of Apples, Composition and Writing, Drawing and Art, Girls' Home Cooking and Fancy Work.

Special Competitions included (1) In each township a Shield is awarded in a competition in Drill. This competition is open to all schools in the township. (2) A Competition is also conducted in Public Speaking, for which cash prizes are awarded.

From the above mentioned classes each pupil was allowed to select one. Up to this year, three dozen eggs were allowed to each school, a nominal charge of twenty-five cents per dozen being collected, and the teacher and pupils deciding by vote who should receive the eggs. This year a change has been made, the cost price of the eggs being charged; this permits all who wish to purchase eggs of this special strain.

The pupils are advised to make their application and selection of seeds after consulting with their people at home and to report to the teacher. The teacher sends in the list of selections made and the seeds and eggs are delivered by automobile or directly from the office if possible. On account of lack of labour it has been found impossible to inspect the plots as in years previous to 1916.

The method followed of financing and paying prize money has been that each School Section was required to make a grant of \$5. Municipal councils and private individuals also made donations towards the prize list. The money received from the sale of eggs has, in the past, been devoted to each township association.

Through the School Fair representatives we received a report as to the number of chickens hatched, and where they were required, the number of leg bands was sent to the pupils.

On School Fair day the pupils are requested to have their exhibits in place not later than 10 o'clock. As far as is possible, the judging of Live Stock and Poultry takes place before lunch. Exhibits are arranged in the tent between 11 and 12 o'clock. Following lunch, exhibits are judged and competitions conducted for the school children. These contests include public speaking, elocution, sports, such as races, tug-of-war, etc., also the drill competition for the township shield.

Two men go with the tent, moving from place to place at night. This method has proven the most satisfactory, as it saves time and labour. The judges assist in the arrangement of the exhibits and the general work in connection with the Fair.

Figures in connection with the 1920 School Fairs in the county give some idea of the proportions which this phase of the work has assumed: Number of Fairs 8, number of schools taking part 72, number of plots 3,235, number of dozen eggs distributed 234, number of entries 3,515. Attendance: children 1,735, adults 1,960.

R. A. Finn, Agricultural Representative, Middlesex County

I BELIEVE that school fairs, to be most successful, should be directed by local people, that is, interested people who realize that

the fairs should be educational. Then, too, on the conducting of the first fair of the season hangs the success of all subsequent fairs. By that I mean that we must present an attractive programme, have capable helpers to carry it out neatly and expeditiously, and arouse enthusiasm among the parents, teachers, and pupils, for the spirit of co-operation engendered by efficient management is taken up by the other districts, and local co-operation—which means success—is assured for the remainder of our fairs.

Practically all the fairs in the province of Ontario are carried on along similar lines, and although the general routine is important, we find that the success of fairs depends, to a large extent, upon special features or attractions.—something to occupy the time between the placing of exhibits and the opening of the tent for inspection. These special features in Middlesex county consist of stock judging and public speaking competitions, demonstrations by the judges of the standards for judging vegetables, and giving reasons for their placings, school parades, table setting contests, and exhibiting trained pets.

To illustrate, a table setting contest was introduced last year at Lobo school fair. Miss M. Stuart, Household Science teacher, London, had charge of this contest, which was open to all public school girls. For the benefit of the many ladies present Miss Stuart gave a demonstration of table setting and invited them to ask questions on any problems in household management. A ploughing match was conducted concurrently, and this held the attention of the men, and at the same time it was possible to get the judging under way and have the tent open when the contests were finished.

The parade is an interesting feature of the day's programme. Some districts have co-operated with the department

with the result that we have been able to secure the services of the town band to lead the parade, and during the afternoon to provide music. I think it might be well to mention one of these parades to point out what a distinct part they play in the school fair. At Mt. Brydges school fair last fall the winning school, S. S. No. 15, Caradoc, illustrated the products of Canada. The pupils numbering fifty-four, were arranged in rows of six in a row, the leader of each carrying a banner bearing the name of a province, and the remaining five bearing in their hands samples of products typical of that province. The leader of the school, marching ahead, carried the Canadian coat-of-arms. Forming a solid square, they sang 'Men of the North.' The awards were based on simplicity, discipline, originality, and singing, and on all these points this school stood high, and presented an appearance far superior to any I have ever seen. To the casual observer these parades may appear to be a waste of effort, but they have a far-reaching effect, both from an educational standpoint, and from the standpoint of creating 'team play.'

We have found that attractive money prizes add materially to the interest in the fair, and if at all possible, school boards should be urged to grant sufficient money to offer up to \$3.50 or more for each class, which could be divided into as many as ten prizes. This attracts most of the children because they know they have ten chances to win a prize.

We have held two school fairs in conjunction with the agricultural society fairs, and these have been quite satisfactory. Where a one-day fair is held, the school fair is practically finished by the time the events of the fall fair begin. Special features like the parades, sports, etc., can be handled between the events on the programme of the other fair.

SCHOOL FAIRS IN THE PROVINCE OF QUEBEC

W. G. MACDOUGALL, DISTRICT AGRONOMIST FOR SHERBROOKE AND STANSTEEF COUNTIES

POSSIBLY the greatest step towards interesting our boys and girls in the rural sections in agriculture was the introduction of the school fair. The aim of the school fair is to bring up a class of girls and boys better fitted for rural life. Therefore, the question arises "How can we make the most of the school fair?"

co-operation of everyone, pupil, parent, teacher, school boards and all agricultural organizations is necessary.

I feel that if the pupils are to receive the greatest benefit from the fair, it should be organized along the following lines:—



ASSEMBLAGE OF PARENTS AND SCHOLARS AT THE ST. RAYMOND, QUE., SCHOOL FAIR

The importance of the school fair cannot be over-emphasized. It should teach our future farmers how they can take the most out of the soil, and at the same time maintain the fertility of the soil. It should make our rural people better and happier. If it is to be a success, the

Distribution of Material and Directions

Seeds and eggs are the materials commonly distributed by the Department of Agriculture free of charge to the pupils, who agree to follow directions furnished and to exhibit at the school fair a portion of the produce grown. Only the best

of seed should be given out, and should be of varieties that have proved suitable for the district. From my experience I have found that better results have been obtained where the pupil receives only one kind of material, as more benefit will be derived from having one kind of crop properly cared for than several partially cared for. Sufficient seed of one kind of crop should be given to enable the pupil to plant a fair sized plot, and it is advisable, where there are several in one family, to have each child choose a different kind of seed or material. In reference to eggs: These should be of the breed most common in the district, and only utility breeds should be encouraged.

If at all possible, it is more satisfactory if the District Agronomist can personally distribute the material to the school, and by so doing make certain that the material is delivered in good condition to the pupil. At the same time, he is able to fully explain the work to teacher and pupil and thereby create a greater interest.

Directions should be furnished with the material. These should be as concise as possible and in case of seed, should give the size of plot, kind of soil required, and other essential points to insure a successful crop.

During the summer, the plots should be visited by the Agronomist, so that he may be able to point out the defects to the pupils. At the same time, he can instruct the pupils as to how to select and prepare their exhibits for the Fair. The Agronomist judges the plots with the use of a score card. I have found that much of the success of the School Fair is due to visiting the plots.

Prize List

The Prize List should be prepared as early in the summer as the Agronomist is able to ascertain the amount of money at his disposal for prizes. Prizes should be offered for the following:—

- (1) Best kept plots.

- (2) At least 2 classes for each kind of material distributed, viz: Oats, best sheaf and best peck. Potatoes, best peck and best plate. (This gives the pupil three chances of winning a prize on his crop.)

- (3) For produce produced by the pupil from the seed grown on his plot the year previous.

- (4) Classes in Cooking, Canning and Sewing: Specific directions for these and patterns for the sewing should be distributed to the pupils in the springtime. Without these, much of the value of these classes will be lost. Demonstrations in canning, cooking and sewing should be given in the school. In many cases the Women's Institute looks after such demonstrations.

- (5) Prizes for manual training.

- (6) Prizes for Nature Collections, such as weeds and insects.

- (7) Prizes for Livestock, such as the calf, pig or lamb, showing the best care on the part of the pupil.

The Day of the Fair

The Agronomist should be on hand early in the morning. The exhibits should be placed on tables, which have already been covered with wrapping paper. The exhibits should be so arranged as to make them attractive, to show the quality of same and to facilitate the work of the judge. All exhibits should be in place before 10.30 a.m., when the judges may commence their work. A good system of taking the entries greatly facilitates the work of the Agronomist on fair day. This day affords an opportunity for the parents, teachers and pupils to become better acquainted, and they usually have lunch out of doors if the weather is fit. Races are held after lunch for the boys and girls, and these add greatly to the pleasure of the day. As soon as the judging is completed and the prize tickets placed on the exhibits,

the people are gathered together and each judge gives a short talk on the classes he or she has judged, telling the pupils wherein their exhibits may be improved another year. Great benefit is derived from these talks as the parents are present and are better able to advise their children in the care of their plots and preparation of their exhibits for the following year.

Distribution of Prizes

It is advisable for the Agronomist to distribute the prize money to the pupils in the schools as soon as possible after the Fair. It affords him another opportunity of speaking to the pupils and explaining how they may improve during the following year. At this time he may also secure the list of material required for each school the following year.

MANITOBA BOYS' AND GIRLS' CLUBS

E. R. HALL, AGRICULTURAL REPRESENTATIVE, MORDEN

THE importance of Boys' and Girls' Club work in Manitoba is becoming more evident each year, and new Clubs are being added to the long list already in operation in the province. The Morden Club is largely or almost entirely a community organization and in order to be effective, must receive the support of the leaders in the community.

Too many clubs make the mistake of not getting an early start for the year's work. The annual meeting of the club should be held before the end of the calendar year, and officers appointed who are known to be interested in the work. We find it advisable to have a project leader for each division of the work, although in some instances two projects may be combined. A good project leader can render valuable service in promoting live stock projects, poultry work, gardening, etc., and through these leaders the club keeps in touch with the work of every boy and girl until that work is completed and has been exhibited at the Fair in the fall. Two or three visits during the season to boys and girls who are rearing calves, pigs, sheep, poultry, or caring for gardens, will go a long way in insuring that work begun in the spring will be carried along through the summer months to a successful finish at the close of the season.

In our work we have found it advisable to print and issue at the same time as the prize list a separate pamphlet containing rules and suggestions covering projects mentioned in the prize list. This aids materially in obtaining uniform results.

Detail arrangements for holding the fair should be made in advance. Exhibits should be in place in sufficient time to allow for a programme after the judging has been completed. This gives the judges an opportunity to explain their work, the basis on which judging is done, and to point out features of merit or demerit that would serve to guide the club in the following year's work. While the judging is being done an outside programme of sports, or a judging competition, provides attraction for the crowd. It is being felt more and more that the Club Fair is not the most important feature of club work, but provides the opportunity for displaying the products of the year's work.

**Mrs. Margaret Jessop, Gladstone,
Manitoba**

The Boys' and Girls' Clubs in Manitoba are a community undertaking. Co-operation and achievement are the watchwords. If carefully and wisely directed, they are one of the strongest

forces we have to-day for training for future citizenship.

In conducting a successful Boys' and Girls' Club, of first consideration is the appointment of a secretary-manager. Besides having the confidence of the community, this officer needs endless enthusiasm and organizing ability. Much will depend upon his ability to arrange to have others look after the details. He should plan to visit all outlying schools, as this not only encourages the members, but is an excellent opportunity of discussing the work with the teacher. The live manager makes an effort to secure high class stock, seeds, and other supplies for the club.

Upon the Project Leaders, one being appointed to look after each main line of work much depends. These leaders should be authorities on their subject, interested in young people and able to give some time to the work. They should ascertain just what members are enrolled in their project, and plan to meet these members early in the season and discuss with them the work they have in hand. An occasional visit from the garden leader often works wonders on both garden and boy. Classes on Saturday for the baking, sewing and canning members, not only help the work but can be made pleasant social gatherings. Project leaders take full charge of their departments at the fair and can be of great assistance to the judges.

In order to keep up interest throughout the whole year, a prize giving, or "Achievement" day following the fair, to which all parents and others interested are invited, should be planned. This occasion serves to emphasize the achievements and ideals of club work. A number of clubs included public speaking with marked success. This work is divided into reading, and story telling for the junior grades, and public speaking for the seniors. During the winter months each branch conducts eliminating contests, and their best story

teller, reader and public speaker represents the branch at the final event held in the early spring.

G. W. Weir, Rosebank, Man.

IN quest of some first-hand information on how to successfully carry on a Boys' and Girls' Club, I was advised to visit a point where they had organized a club a little over a year ago and seemed to be doing splendid work with the young people. I called at the local bank and found the Manager was also the secretary-manager of the Boys' and Girls' Club. I found that this young banker, besides being well informed upon the agricultural needs of the district, was a promoter of sports, entertainments, social gatherings, and in fact, all community activities.

Success had come to this Club very largely through having an organization which worked in harmony with other organizations in the community. At the first meeting when the Club was started, it was clearly intimated that only active workers who were interested in the welfare of children were wanted on the executive. It was recognized by all that success to a very large extent depended upon the active support and co-operation of the teachers, as much of the work must necessarily be directed from the school. Not only have they had this co-operation from the schools, but the whole community has been behind the work.

This Club decided upon the plan of specializing on some one main activity each year, besides carrying on the regular work. This year it is to be the rearing of swine. Another year it may be grain growing, poultry, gardening, or calf rearing.

It was interesting to note just how the hog scheme had been planned. Included in the club prize list was a section for a litter of six pigs, besides sections for pairs and single pigs. A boy who intends to show a litter, procures

a sow during the fall or winter. He can borrow the money from the bank or from his parents to make the purchase. He buys the feed and assumes absolute responsibility of the sow and litter. The litter is shown at the fair. It is also the intention of the club, after the fair, to ship a car load of hogs to Winnipeg to be sold co-operatively, and the boys are to get the money. I found they had twenty-three boys each rearing a litter of Yorkshire pigs.

Another feature this club is pushing is summer classes in live stock judging. A competition will be arranged for at the club fair between the different schools, and the winner will have a trip to the Agricultural College. The Club also intends to have a "Field Day," emphasizing team games between the various schools with a view to encouraging good clean sport.

Plans have been carefully laid for the girls' activities. Classes in cooking, sewing and canning are held at regular intervals. Project leaders, who are the women most interested in these subjects in the district, meet with the girls and give them the necessary instruction. Team demonstration, which is becoming so popular with Manitoba club workers, is being taken up, and it is hoped to have this year demonstrations on a variety of subjects. Last year at the fair the girls prepared and served lunch, the proceeds going toward club funds.

Interest is kept up throughout the year. In addition to the regular club projects, meetings are held at which a social programme is provided which includes community singing and group games. Club entertainments and the "Field Day" are special events to which all in the community are invited.

BOYS' AND GIRLS' CLUB PROGRAMME IN BRITISH COLUMBIA

J. C. READEY, DISTRICT SUPERVISOR OF AGRICULTURAL INSTRUCTION, CHILLIWACK

CLUBS are being formed during the present season with Jersey calves, Ayrshire calves, Chickens, Pigs and Potatoes. The purpose of these clubs, briefly, is as follows:—

To arouse in rural children a spirit of independent enterprise; to arouse interest in Live Stock and Good Seed in the farm operators of to-morrow, and in the present operators through their children, and to bring in a maximum number of well bred animals and a quantity of good seed at a minimum cost. Very gratifying success has been attained thus far with the calf, chicken and pig clubs, but there has been but little response to the offer of good seed potatoes. The apathy to the potato project is probably due to the extremely poor marketing conditions for potatoes which prevailed during the year.

The Jersey and Ayrshire Calf Clubs are being organized locally under the auspices of the breeders of these two breeds of cattle co-operating with the Merchants' Bank of Canada and with the Agricultural Instruction Branch of the Department of Education. The work is under a management committee composed of three breeders in each case, together with the local manager of the Merchants' Bank and the District Supervisor of Agricultural Instruction. The clubs have been organized through the schools by the District Supervisor, while the passing upon applicants, and the securing of the calves has been attended to by the breeders who are the members of the management committee. The bank advances the money to members of the club in a sum up to \$125, on the application of the club member, and on

his own personal note. The parents' consent to the transaction must be given, but the parents are not held responsible for the payment of the money borrowed. The notes will fall due at the end of the present year, but will be renewed for another twelve months to allow the club member to avail himself or herself of the natural increase before being called upon to pay back the money. The management committee, however, reserves the right to require the sale of the animal at any time, provided there is evidence that the calf is not being properly cared for.

The Chicken Clubs are locally under the auspices of the local poultry association and the Agricultural Instruction Branch of the Department of Education. The work of organizing is carried on by the District Supervisor of Agricultural Instruction, as in the case of the Calf Clubs, but the members of the association agree to provide eggs from their mated pens at \$1 per sitting. Applications for eggs are received through the schools, and the eggs are delivered to the pupils or club members at the schools which they attend. Sittings of Orpingtons, Plymouth Rocks, Leghorns, Rhode Island Reds and Wyandottes are available for club members.

The Pig Clubs have been organized by the District Supervisor of Agricultural Instruction. One of the well known local breeders of Yorkshires has agreed to provide pure bred registered sows 6 to 8 weeks old at \$10 each to club members; no grade stock is being recognized in the club work. Applications for the pigs come in through the schools as in the case of the other clubs, and the pigs will be delivered to the club members about the first of May.

At the present time, there are 113 members in the Chicken Clubs, 30 in the Calf Clubs, and 19 in the Pig Clubs. In all cases it is stipulated that club members must exhibit at the School Fair, which is held in conjunction with the annual Chilliwack Exhibition in September. In the case of poultry, members are required to show a pen of three pullets and one cockerel. Chickens will be judged from a utility standpoint. Breeders of cattle and chickens are offering cups as prizes, in addition to the prizes being offered by the Merchants' Bank.

This work was started primarily in this province under the Department of Agriculture and is now being enthusiastically supported in this district by local organizations and individuals who are in a position to help.

THE CHILLIWACK SCHOOL-HOME PROJECTS DISCUSSED

A Number of Writers Give Their Views on the Desirability of the Form of Practical Projects Outlined for the Chilliwack High School which appeared in the Previous Number of the Agricultural Gazette

DR. J. B. DANDENO, INSPECTOR, ELEMENTARY AGRICULTURAL CLASSES FOR ONTARIO

AGRICULTURE as a subject on the curriculum of the High Schools of Ontario at the present time is optional and has the standing only of a bonus on examinations. Consequently, no matter how important or attractive the subject itself may be,

progress will certainly be slow as long as the present conditions remain. Notwithstanding this handicap, the subject is now being taught in twenty-eight High Schools of this province with good success. The home project is a part of the course in agriculture

and has been incorporated with the work ever since the subject was introduced into the secondary schools, which was about seven years ago.

Home projects with us in Ontario are of such a character as can be adapted to the needs of students in either town or country, and girls as well as boys. The following classes of students have been kept in mind when topics were arranged: (1) those living in town where the High School is located; (2) those living in the country and boarding in town from Monday morning till Friday night; (3) those boarding in town throughout the school term.

An exceedingly extensive range of topics must, therefore, be provided. Whether the list of projects indicated by Mr. Readey will meet with the conditions named above remains to be seen, but it is doubtful.

The most serious defect of the Chilliwack scheme is found in clause 4.

"A maximum of 20 per cent of the total school credit will be allowed for the satisfactory completion of one major or two minors."

If 20 per cent of the four-year course is recognized as the equivalent to, say, caring for a flock of not less than twelve sheep for a year, then it is quite apparent that the High School course referred to is a very light one, because the completion of such a project involves, in Ontario, too small an amount of work to be made the equivalent of nearly one year of the High School course. Moreover, another objection to such a project is that during the time the pupil is free to do project work during the summer there is little to do in managing a flock of sheep.

Since most of the projects outlined in the Chilliwack scheme are adapted only to those living at home in the country and at home night and morning only, a very few (in Ontario not 5 per cent of those in attendance at the High Schools) could participate in such projects.

In Mr. Readey's attempt to get away from what has been termed "play-like projects" he is making the error, which has been made, off and on for 300 years, namely, to vocationalize the work at a time in the student's life when education is the chief concern.

If the prime object of the Chilliwack scheme of home projects is to make agriculturists of the pupils, or to prepare them to make a living at some phase of farming, without at the same time preparing the pupil for entrance into all the higher institutions of learning, the scheme is doomed. If, on the other hand, the project idea is developed as part of a liberal education leading to any institution, professional or otherwise, it is sure to succeed if managed wisely; more especially because home projects, when carried on in connection with the class work of the school under the direction of the teacher, deal directly in so many ways with the mental, moral and physical development of the pupil.

R. B. Vaughan, Director, Technical Education, Manitoba

The problem of teaching agriculture in the high school is one very similar to the commercial or industrial problem for the same educational period. While there is considerable disagreement among educational authorities over the method of teaching and amount of time devoted to these subjects, my opinion is that we must make two classifications of courses to meet the demands of students according to their educational ability, opportunity and economic conditions.

I. For students who can later attend higher institutions there should be a high school course which is much the same whether given in the city or in the country. Optional, industrial, commercial or agricultural work contained in the course, comprising from 10 to 30

per cent of the total time, can be applied to the vocational life most appropriate to the community, but the work should be taken up seriously and done in a practical way.

II. For students who are unable to complete high school graduation and take special training later, a commercial, industrial or agricultural course needs to be provided; this provision to be a two or three year course in agriculture, commerce or industry not meeting university matriculation requirements but leading to proficiency in the vocation. As such, these courses require large administrative units, with special teachers and as far as agriculture is concerned can probably be best carried on as diploma courses at the Agricultural College.

Taking it for granted that the work herein discussed is to relate to the regular high school course (No. 1), which students will take from the standpoint of general education, this project method seems to be the very best way of taking it up. It will bring into the regular curriculum a line of thought and action that will tend to vitalize the whole course, giving the student a practical method of applying scientific methods to a concrete problem, and a chance to show the agricultural people of the community that the work is educational by permitting the student to get results in advance of his parents unless his parents are following the best methods.

The greatest handicap in educational work in rural and town schools is the lack of equipment. The greatest criticism of what equipment is usually available is that it is not practical. Further a more serious criticism of the work of the school is that the instruction is not practical and never gets over into actual operation. Now if the actual farm equipment can be used and through the influence of the school with increased efficiency on the project involved, if the boys learn how to conduct project work by following scientific methods that will surpass the old hit and miss methods

and if the school and the farm have come to the state of mind where they can shake hands, then this accomplishment will mean something to the community. The most difficult part of this programme is to find high school teachers who are qualified to teach the work, and to meet this difficulty in Manitoba provision is made at the Summer School for teachers whereby the heads of the departments of the Manitoba Agricultural College will give a course to the high school principals and teachers that will enable them to conduct this agricultural work in their schools throughout the year. It will give them an idea of method in outlining and teaching these projects and also by keeping the teachers in touch with agricultural methods will keep up the agricultural spirit in the high school. Grade IX Agriculture will be taught at the summer school in 1921, Grade X in 1922 and Grade XI in 1923.

L. A. DeWolfe, B.A., M.Sc., Director of Rural Science, Truro, N.S.

The list of projects in agriculture offered in the Chilliwack High School certainly covers the ground thoroughly. Under the proper leadership, the plan should work. From our experience in the East, two objections at once occur to us: (1) Our Eastern High School curriculum is a college preparatory one. Agricultural projects, therefore, would not find favour until our curriculum is modified; (2) Our farmers who send their sons to High School want them all to be ministers or doctors or lawyers. If they want the boy to be a farmer, they keep him home from school.

Until, therefore, there is a demand for agriculture in the schools the project will fail so far as High School is concerned. It should be popular with the boy and with his father; but they look for such work from some other source than the school. The schools, of course, are to blame for this. They have always been "academic" in their teaching.

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Anything else now is regarded as heterodox.

Let us hope that leaders will arise who will mould public opinion towards a saner curriculum for rural schools.

B. J. Hales, M.A., Principal, Normal School, Brandon, Man.

Teaching by assigning projects which the pupils must work out for themselves is not new. It is the method by which the apprentice learned, and is as old as apprenticeship itself. With the passing of apprenticeship, the method fell into disuse; and its recent revival as a school method, is an attempt to replace the habit of overteaching, by reverting to the older practice.

The pedagogical value of the method lies in the opportunity which it offers for the introduction into the schools of the activities of the community, thus bringing the school life into closer contact with what is going on outside, and fitting the pupil more directly to enter his life work. This awakens interest in school subjects by giving them a reality which they often do not otherwise possess, and increases the value of the school work in the eyes of both pupil and parent.

There are two very obvious dangers which must be avoided in the use of this method of teaching. If the projects are merely those of the schoolroom, the interest will not be lasting; and time may be wasted in play-like occupations which have little real value. On the other hand if the work assigned is so eminently practical that the educational features are lost sight of in the effort to produce something with a money value, the pupil becomes an apprentice only. If much manual labour is involved the work may degenerate into drudgery with an accompanying deadening of interest and failure to stimulate effort. Examples of this are sometimes found when the chief aim of

manual training becomes the production of schoolroom furniture, or the repairing of the building; and where everything in the household science classes is subordinated to the conducting of a cafeteria.

In the teaching of agriculture this method promises to be particularly useful. In Manitoba it is followed almost exclusively, but the work is under the extension department of the Agricultural College. Boys' and Girls' Clubs are formed by the co-operation of the teachers, the inspectors and the representatives of the extension department; and the results of the summer's work are exhibited at school fairs in the fall. The projects are carried on at home and how much teaching is done in the school, or to what extent other school subjects are correlated with this work, depends of course on the teachers. No one, I suppose, will claim that ideal work is done, but certainly more real agriculture is taught than can be done by making it a purely text book subject.

With the extension of this method to high school work the opportunity becomes greater. Projects involving closer study and more intelligent effort can be assigned.

The list of projects assigned for this year in the Chilliwack High School seem to be of real high school grade. They certainly show no tendency to become mere classroom exercises, and if they can be kept from the other extreme should mean a very real kind of teaching. I take it, of course, that they are along the line of the work of the district served by the school. If the school can do the teaching necessary to make these something more than mere manual labour, and an interest can be aroused in this work which will carry over into the language, science and mathematics of the school, it seems to me that Chilliwack will have a truly agricultural high school.

**John Dearness, M.A., Principal,
Normal School, London, Ont.**

As a reader interested in educational as distinguished from merely vocational work in agriculture in the schools I have carefully examined the school-home projects syllabus prepared by Mr. Readey for the Chilliwack High School. The two dozen well chosen projects distributed over six important lines of agriculture in a locality where mixed husbandry in field, garden and orchard can be successfully prosecuted will secure a practical and well worth while application of the scientific education given in the high school.

The printed conditions do not make it clear whether a student is limited as to the number of projects undertaken but the caution not to undertake more than can be well done and the precaution that secures the approval of the parent at the outset are well advised.

The declaration that the home-projects will not displace "the outdoor laboratory familiarly but erroneously called the garden" deserves more enlargement than is accorded to it. That so many people fail to see the difference in the nature and purposes of the school-garden as compared with the home-garden is the cause of much indifference towards educative school-gardening even among agriculturists. The sciences underlying gardening can be taught and should be taught by the nature-study or investigational method with the school-garden as a laboratory or field of observation and experiment. Home gardens and home situations are the very best places to apply the truths learned heuristically at school especially when the applications are carried on under the cognizance of the teacher.

It is to be hoped that Mr. Readey will report the results of his efforts when the season closes.

W. J. Bell, B.S.A., Principal, Agricultural School, Kemptville, Ont.

The account, in the last issue of the Gazette of School-home Projects in the Chilliwack High School," was of considerable interest to all interested in the question of agricultural instruction. In Ontario this matter has been given considerable attention. The six graduates of the Ontario Agricultural College who were first appointed as District Representative to an equal number of counties in the province, had as one of their many duties, the work of teaching agriculture in one of the High Schools of their county. Owing to a multiplicity of other duties and to a lack of support of High School principals and officials, the undertaking was abandoned, although, in some schools, good results were accomplished and considerable enthusiasm was shown in the work by students. In later years Agricultural Representatives have been co-operating with rural public school teachers in an endeavour to stimulate a greater interest in agriculture, and the School Fairs of Ontario are doing much to create in the farm boys and girls a greater love for farm work and life, and a greater pride in the products resulting from the intelligent cultivation of their home plots and gardens; while the rivalry between schools, composing a school fair district, has done much to establish a desirable community spirit that should be of material benefit if fostered by parents and others.

Knowing the history of the teaching of agriculture in Ontario many will watch with interest the results of Mr. Readey's work in British Columbia. His programme is an ambitious one, covering, as it does, a wide range of subjects and work, all of a practical and useful nature, and if properly taught, should result in developing a much greater interest in the study of agriculture and a more intelligent knowledge of the principles underlying approved practices in tillage and stock

raising, in rural economics, and the business of farming, vegetable and fruit growing.

Three things are absolutely essential to the success of the programme outlined for the Chilliwack High School, namely, proper teaching, co-operation of teachers and parents, and the enthusiastic support of school officials, teachers and board.

Only those teachers, who have been trained in an agricultural college can successfully teach agriculture to high school students. The teacher must be familiar with both the science and practice of agriculture, if results are to be satisfactory. He also must be in sympathy with the farmer and his work, as well as with his students.

There should not be much difficulty in securing the co-operation of the students' parents. While too many farmers fail to see the necessity for giving their children the advantage of a good education, agricultural or otherwise, those who send their children to receive the advantages of a high school training will welcome the introduction of agriculture on the school curriculum, which should make the student of more value in assisting with the work undertaken at home.

In some schools there would likely be too little support from teachers in other departments and from the school board. Doubtless, such will not be the case at Chilliwack or there would have been a much less comprehensive programme prepared. In Ontario our high schools and collegiate institutes have devoted their energies mainly to preparing their pupils for professional, and, more recently, for business life, and agriculture has had little, if any, consideration. The result has been that too few of our future farmers have had the training necessary to fit them for successful and useful rural citizenship. The result in Ontario has been to send our farm boys to an agricultural college or school, where the programme of studies has been arranged

to train the young farmers in cultural subjects as well as in the science and practice of agriculture. Under favourable conditions, an elementary study of agriculture in our high schools could be successfully carried on and be made of great value to students—but it must be properly taught by competent instructors and be loyally supported by school officials and parents.

J. G. Adams, M.A., Principal, Beamsville, Ont., High School

In the home project, so called, the spirit of the school laboratory should be carried to the solving of the home problems. Many subjects discussed in the agricultural classes do not lend themselves to laboratory demonstration as for example methods of weed eradication. Others are not practically correlated, as the value of a certain insecticide in combatting a particular insect at the proper stage of development of the insect and of the bud of its host plant. Of course, much may be done to test class theories in a well conducted school garden, but because of the varied nature of the topics all cannot be experimented upon even there and the home project offers a means of helping out.

The application of principles evolved in class to home problems arouses and stimulates the pupil's interest. He sees that the class work is not a dry theoretical discussion but something that can be linked up with every day affairs and the teaching becomes easier because of a more receptive mind.

The home project scheme if properly supervised links up the parent with the school. It perhaps first invites this criticism. If, however, the teacher oversees the work and visits the pupil at his home during the time the problem is being worked out he usually succeeds in interesting the parents and in securing their active co-operation in the work.

The scheme may be criticised as an educative one because most of the topics suggested for experiment may lead to the

making of a profit by the pupil. And yet since applied agriculture is a money making project and since the profit making part of the work is frequently the key to the pupil's interest why should this criticism be offered? If the work be planned and carried out under the teacher's guidance the value of the experimental side of the work may be stressed and an appreciation of it given incidentally.

In our work the pupil is given a choice of problems from a number suggested or of any which may appear after consultation with his parents as being particularly adapted to his home conditions. After the choice of the project is made reference works including texts or bulletins of the Provincial or Dominion Departments of Agriculture are suggested. He is encouraged to apply for bulletins by writing to the local representative or the department in question. A plan is then submitted which includes the name of the project and its purpose, the titles of reference works consulted and the outline of the plan of attacking the problem. This plan, of course, is not meant to be a rigid one but a guide to direct his work. When the problem has been completed a detailed report of deviations from the original plan and of the results of the work is required to be appended to the outline plan.

In the majority of instances when the proposal of a project is asked for it is given as a determination of the possible profit to be derived. This cannot be objected to because if the work is alienated from the profit idea too often one loses the interested participation of the pupil and the wholehearted co-operation of the parent. Yet when reports of results are submitted and discussed in the class room it is usually found that the pupil has gained some very clear notions of general methods of pursuing experimental work and of its value. He is then on the highway for obtaining information by personal investigation—the course to the truest education.

**Thomas H. Follick, M.A., Principal,
Port Perry, Ont., High School**

I have read with much pleasure and benefit Mr. Readey's account of the home projects in agriculture conducted by the boys of the Chilliwack High School. It is quite obvious that conditions which are suitable in one part of Canada are not always so in another part, owing to differences in the courses of study and differences in the home conditions of the students. Since reading Mr. Readey's article I have been endeavouring to decide how many of his proposals are applicable to a rural high school in the centre of the Province of Ontario, and I have come to the conclusion that nearly all could be undertaken here. I have, however, a few comments to make which arise out of the conditions peculiar to this province and this locality.

Nearly one-half our students come to school on Monday morning, board in town until Friday afternoon, and then return home for the week end. Almost all our agricultural students follow this custom. In selecting their home projects the latter must avoid the raising of poultry and other live stock. The work of the students with the animals would occupy not more than two days out of the seven, and this is too small a fraction of time to be of much value.

We have never required the written consent of the parent or guardian, although it is easily seen how useful that would be. But the teacher of agriculture is required to visit the students once or twice in the season, inspect their work, and have a full discussion over methods in home projects and work in school generally. We find this to be of the greatest use to the student, and also to the agricultural department and the whole school.

All proposals of home projects must be accepted by the teacher before the work is commenced. One difficulty we

have is to limit the number of undertakings the boys propose, so as to secure a high standard of work. They are certainly enthusiastic over this branch of their course. In the annual report to the Government an account of the nature and results of the home projects must be given, and the inspector in his regular visits makes careful inquiry into the matter. The boys know these things, and have thus an added stimulus in their work.

Part of the agricultural course in this province is called Farm Mechanics, covering such work as carpentry, forging, harness repairing, cement work, and other operations which a farmer is frequently called upon to do at home. Many of the home projects which our boys select are in this kind of work, and in some cases, especially among the older

boys, undertakings are carried through successfully that might at first seem large, such as constructing and furnishing poultry houses, and building cement foundations, floors and walks.

In the school regulations issued by our Provincial Government we have had before us for several years many topics suitable for home projects in agriculture, farm mechanics, and household science. While these are helpful and suggestive it is refreshing to have a list like that in Mr. Readey's article under the heading "Rural Economics." If the attention of our boys can be diverted to some extent away from little money-making questions at home to a broader view of their neighbourhood and of our country in general with its public problems and requirements, the agricultural course in our schools will have served one of the highest and noblest purposes.

SHALL WE STANDARDIZE ELEMENTARY AGRICULTURAL INSTRUCTION IN CANADA

BY J. W. GIBSON, DIRECTOR ELEMENTARY AGRICULTURAL EDUCATION

AT the present time each of the provinces in Canada has its own policy and method of administration in matters pertaining to agricultural education. Each also has its own curriculum of agricultural studies in public and high schools. The same holds true with reference to the preparation of teachers in summer schools, and in normal schools. So long as provincial funds only were utilized in carrying on the work of agricultural education there could be little objection to complete provincial autonomy in this matter, but now that funds have been liberally provided by the Federal Government for agricultural instruction throughout the whole of the Dominion, it is only reasonable to suppose that some measure of standardization might and should

obtain if for no other reason than that of insuring efficiency of instruction. Admitting that each province has certain problems of its own which it must deal with, the fact remains that all have much in common, and this common cause transcends in importance any local variations which may exist.

Apart from the machinery of administration which is already variable to a ridiculous extreme amongst the provinces, there are other problems relating more directly to the amount and character of the instruction given which readily lend themselves to a measure of standardization, such as (1) the question of teachers' preparation and qualifications as instructors in public school

nature study and elementary agriculture; (2) qualifications of teachers of agriculture in high schools and collegiate institutes; (3) courses of study in public schools and high schools; and (4) agriculture as a subject for matriculation and how it can best be treated as such. If we, in the different provinces, could agree on the desirability of standardization along these lines as a working principle and could understand once and for all that standardization does not mean uniformity, there seems no good reason why we should not get together in the accomplishment of a great common purpose—the raising of the status of agriculture as a subject of instruction and the improvement of rural life and education in Canada. Standardization in the matter of the training and qualification of public and high school teachers is particularly desirable in view of the fact that teachers move from province to province and not infrequently find their qualifications discredited in their new positions. The two main points to be considered in this connection are normal training courses and summer school courses. Public school courses in nature study and elementary agriculture are bound in the very nature of things to vary widely in subject matter, but the fact that one province stresses field crops and live stock, and another dairying and horticulture, does not at all preclude the adoption of certain reasonable standards of work. Similarly in high schools the subject matter of instruction may show some variation in the different provinces although the amount of work accomplished might readily be standardized. This would also involve consideration of the qualifications of teachers in high

schools who give instruction in agriculture, a question of great importance and one upon which the provinces should deliberate with a view to standardization. A settlement of this question would help very materially in settling another, viz., the place of agriculture in high school courses as a subject for university matriculation. Already the provincial universities in Western Canada have acknowledged the importance of agriculture as a subject of instruction by making it equal with other science subjects for matriculation purposes, and there can be no doubt that the other universities of Canada will do the same as soon as they can be assured that the instruction given in this subject is of a uniformly high order.

Rural pursuits and rural population are gradually but surely giving way before the constant and unremitting lure of city life and city occupations. This insidious force of cityward attraction is quietly working in the face of all that has been done to offset it. It bids fair to become at no very distant date nothing short of a national calamity. Cannot rural education be so directed throughout the length and breadth of our great Dominion, with its immeasurable possibilities for agricultural production, that the majority of our boys and girls will come to have a better knowledge and consequently a greater appreciation of the country itself and will be content and happy to live therein? Some of us think it can, but the provinces should take counsel together without delay with a view to the inauguration of a great forward movement in agricultural education such as would have the whole-hearted support of Dominion as well as Provincial Governments.

HOME DEMONSTRATION WORK AND PROGRESS IN PEEL COUNTY, ONTARIO

Junior Activities Emphasized—County Organization Effected—The Value
of Child Welfare Work Demonstrated

BY MISS K. F. MCINTOSH, HOME DEMONSTRATOR

HOME Demonstration work was carried on in Peel county during the past year very much as outlined in an article published in the December, 1919, issue of the *Agricultural Gazette*. Certain activities, in some sections, have been outgrown. For example, in July, 1919, we held a dental clinic in Malton at which children from four rural schools had defects actually attended to. When the next vacation time approached similar effort was considered. The Home and School committee of the local branch Institute—two women from each section—took a survey previous to our making final arrangements. They discovered that practically every child in those four sections was having regular dental attention. Another clinic there was unnecessary. Other points now are being worked.

From the four points where sewing classes were held, requests are in for further courses. To-day "homemade" with reference to clothing need not be an idiom of contempt. As well as having a choice of what garments shall be made, members are given instruction in choice of colours, materials and styles.

Child welfare week was held in one rural district. Twenty-three children of pre-school age were brought to the clinic by mothers or older sisters. Branch Institutes were interested in the school for Rural Leaders, and one group sent two of their younger members to the College at Guelph for the two weeks of this summer course.

While every division of effort presents interesting features, no single phase equals that of Junior activities. We wish to preclude any possibility of these

girls arriving at that state of workworn listlessness—the fate of far too many farm women—which is so deadening mentally and physically. In the county we have now seven Junior Institutes, including the one just organized at the close of the January Short Course in Home Economics. Four of the six, during the past year, might be termed active. The Alton Institute, whose members are practically all girls who work in factories, has been meeting once a month for almost three years; mainly for social intercourse. Occasionally they have a paper or address followed by a discussion; always music. Quarterly, at a joint meeting with the Women's Institute, they supply the programme. Last Spring they put on a play and in December completed a course in Home Nursing and First Aid. A donation of twenty dollars was made to the School Nurse Fund.

The Cheltenham Junior Institute, organized in January, 1920, meets every two weeks, alternately by themselves and with the Junior Farmers. Many social gatherings of a community nature, only dreamed of before—corn roasts, a bazaar, toboggan and other parties and picnics—have been thoroughly enjoyed by the young people. This group of girls has chosen to assist families placed by the Soldier Settlement Board in Northern Ontario. Sewing for the younger children received special attention. Five boxes of magazines were sent to addresses supplied by the Board.

Ebenezer meets with the Junior Farmers once a fortnight. Whether one goes out to a special meeting or drops in at a regular one, the attendance is

surprising. Committees of two, one from each organization, are responsible for programmes. Debates, addresses by members and others, games and athletics under supervision of the Y.M.C.A. secretary, plays, contests, and matches vary these and prevent monotony. Following the programme, there is always a social time during which those present fully enjoy the piano which they purchased co-operatively and placed in the township hall last year. Having these regular "good times" together prevents any tendency toward dragging country parties past the "wee sma' hours" to very nearly those when he who would thrive is rising.

Streetsville gave generous donations to the Children's Shelter and School Nurse fund and helped the Senior Institute. Their play, "The Call of the Country," given by some twenty girls last March, was so successful that it was repeated by request in their own community within one month of its first presentation. Money was given to the township agricultural society to be applied on the Junior Institute section of their prize list.

A class was organized for University Extension with members drawn from both Junior Institute and Junior Farmers. Classes opened on November 15 and continued until the end of March. Lessons are given weekly by Professor Coombs under the auspices of Toronto University. The correct use of the English language, Literature and History are being studied by way of a course in Cultural English. Some thirty members attend regularly, and at a debate, given by these Juniors, ninety were present.

Caledon and Palgrave have not been especially active, some members of the former being graduated to the Senior Institute. Both, however, are ready to help with any project with which we require their assistance.

County Organization

With the idea in mind of forming a county group, we held a banquet in May. About sixty members were present. After addresses by prominent Institute speakers and others, the Peel Junior Institute was organized with this constitution:

1. The organization shall include all Junior Women's Institutes in the county and shall be known as the Peel Junior Institute.

2. The objects of this organization shall be:

- (a) To further all aims of present J.W.I. branches and stimulate interest in their activities.
- (b) To arrange county competitions as Breadmaking, Sewing, Judging and Poultry Contests and inter-institute debates;
- (c) To promote all work for the progress of rural life;
- (d) To further social relationships and interchange of thought between various branches and their members.

3. The officers of the organization shall consist of a President, two Vice-Presidents and a Secretary Treasurer elected at the annual meeting and a committee of directors composed of presidents and secretaries of branch Junior Institutes in the county.

4. The organization year shall commence on March 1.

5. Ten members of the organization shall constitute a quorum for the transaction of business. Four members of the executive shall constitute a quorum for the transaction of business.

6. There will be no membership fee. Members of a branch Junior Institute shall be members of the Peel Junior Institute.

7. This constitution may be amended by a majority vote at any regular meeting.

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Our slogan was taken from the meaning of the word Peel—"Forward—for the Progress of Rural Life."

Last fall we had a judging competition at the Brampton Fair. Teams were organized, classes held and practical work given. Prizes were offered by the County of Peel Agricultural Society.

Team Competitions

The competition was open to teams of three girls from each Junior Institute. Each team was required to judge at the Brampton Fall Fair in three or more classes in Cooking and Sewing.

In cooking we chose homemade bread, tea biscuits and layer cake; in canning, tomatoes, raspberries, and chicken; in sewing, hand hemming, centrepiece, laundered linen, pair of curtains, child's romper suit and woman's housedress. Prizes were Boston Cooking-School Cook Books, "Clothing for Women" by L. I. Baldt and "Home Economics" by M. Parloa.

Feeling that home demonstration was applicable to a certain extent to women and girls of all except the 'teen age, our 1920 plan of work included a Girls' Training Camp. Through this, too, we hoped to bring girls from all over the county in contact with each other.

The Y.M.C.A. offered the use of their camp site on the lake front, with tents and equipment immediately after the boys finished their outing. A committee of the Women's Institute worked on the project. One branch paid the expenses of two girls who would otherwise have had no holiday. Activities during the ten days were much the same as at a Y.W.C.A. camp. Twenty-three girls enjoyed the work, study and play together.

Child Welfare Inspection

A rural school nurse seemed to be the logical person to carry on follow-up

work after the Medical and Dental Inspection had been completed. We proposed to the Peel Institute at the annual meeting in June, 1919, that this be their special work for the coming year. A standing committee on Public Health and Child Welfare was appointed and we asked the sixteen branches to raise funds for the purpose. Our nurse began work on April 12, 1920, working under a regular agreement drawn up for the purpose.

An itinerary covering the county was followed and a list of teachers, trustees, pupils on rolls given the nurse. Trustees and Institute officers were notified of visits. The supervisor of school nurses, with the Department of Education spent three weeks with us at the beginning.

Covering the period from the commencement of the work until Christmas vacation, 87 school visits were made. Seven of the 79 schools had not been visited, eleven visits had been made to two-roomed schools and six schools had a second visit and one a third. Records account for the 3,948 defects of the 2,979 pupils examined as follows:—

Vision.. . . .	414
Hearing.. . . .	74
Eye disease	102
Ear disease	5
Nasal breathing.. . . .	492
Tonsils.. . . .	584
Anæmic appearance.. . . .	152
Teeth.. . . .	1,569
Enlarged glands.. . . .	395
Defective speech.. . . .	40
Skin disease.. . . .	59
Nervous disorders.. . . .	26
Retarded mentality.. . . .	20
Orthopædic defects.. . . .	2
Malnutrition.. . . .	10
Cardiac disease.. . . .	2
Defective palate.. . . .	1

This shows 133 per cent of defects. In the earlier examination the percentage was 150. Improvement is marked though slow. It will not be known until a second round of visits has been completed just what has been accomplished, although we do know that thirty pupils have had tonsils and adenoids removed,

and quite a number have received attention to eyes and teeth. One section spent somewhat over two thousand dollars (\$2,000) on its school building by installing a new furnace and laying new floors. Four hundred and fifty-four home visits were made and one hundred and ninety consultations held.

Regarding finances, as yet this has all been carried by the District Women's Institute through its branches, no assistance coming from any other source. We

estimate that it will take at least two thousand dollars to carry the project to the end of June next, but in face of what appears to be done the expenditure seems small enough. Our motive has been to demonstrate to the rural people the necessity and practical value of such work and it is hoped that the county council can be interested in providing such service beginning in September, 1921.

THE AGRICULTURAL DEPARTMENT OF THE PORT PERRY HIGH SCHOOL—Continued

BY THOS. H. FOLLICK, M.A., PRINCIPAL

IN accordance with the regulations of the Ontario Department of Education, we have an Advisory Board of eight members, four of whom belong also to the local Board of Education. The support given the agricultural department of the school by these members is valuable, and is very encouraging to all the teachers. One of the most useful plans now being carried out is the securing of men and women to come to the school and talk with the students on special forms of agricultural work in which these visitors have specialized. One man is given an afternoon and he introduces the subject, say, of dairy farming. He does not necessarily lecture on it but conducts a discussion of various phases of the subject, and answers any questions asked by the students. Another man takes up the different kinds of draught and carriage horses, another bee culture, another grain farming, another small fruit growing, and so on. Such conversations are most interesting, and are a delightful variation from the cut-and-dried lessons of the regular teacher. From ten to fifteen afternoons in the year are so spent, and not only are the students benefited, but the agricultural work of the school

becomes better known throughout the surrounding country leading to rapid growth of the department and of the school as a whole.

For admission to the course, students of fourth book standing in public school who are recommended by the public school inspector and the principal of the high school are eligible, in addition to all students who have passed the high school entrance examination. Agricultural students are admitted to the regular classes in grammar, literature, arithmetic, history, geography, writing, spelling, and other subjects belonging to an ordinary English education that are named in their course. The special classes in practical and theoretical agriculture occupy about three half days in the week.

Farm Mechanics Popular

The farm mechanics portion of our agricultural course is very popular with the boys, and they would spend all or nearly all their time at that work if they could. Here they learn to use carpenter's tools, forging, rope splicing, harness repairing, cementing, and other mechanical operations to equip them as "handy

men" on the farm. Many of the furnishings of our farm mechanics building have been made by the boys themselves, and they are planning further improvements which they are eager to commence.

The School Garden

An essential feature of our work is the cultivation of the school garden. At present it consists of a vacant lot which the school board has purchased, fenced, and fitted with hydrant and tool house, the latter constructed in part by the boys. On this piece of ground various agricultural experiments are conducted, the results of which we can easily make known through the kindness of the editor of the local paper, who has freely opened its columns for the use of the school. A perennial flower border, beds of choice plants, a wild flower garden, and lawns are arranged in addition to the vegetable and grain plots, and as the lot is situated on the main street, the whole of our work is under the observation of the public, and this a powerful stimulant to good work. However, the boys declare they are not so sensitive to the criticisms of the public as they are to the chaffing of their fathers and older brothers if their farm work at school is faulty. The crops grown are disposed of in three ways. Part is retained in the school to use for planting next season, part is distributed amongst the neighbours, who in various ways help the boys in their work, or among poor families in the village, and the remainder is taken by the boys to their own homes.

Home Projects

The students are expected to perform a suitable amount of work at their homes. After consultation and discussion in the class they select what they think they can do well, and this work

they carry on during the spring and summer months. Some of the selections made are rearing a flock of pure-bred fowl, rearing one or more farm animals, such as calves, sheep, or pigs, cultivating home gardens, making and caring for home lawns, construction of poultry houses or other small buildings, cement work about the home, and many others. Once or twice a year the teacher visits the students at their homes, inspects their home projects, discusses with the parents the school prospects of the students, forms a better acquaintance with both students and their parents, and incidentally increases public interest in the school and the agricultural department. This custom of visiting is not merely a duty, but it is one of the greatest pleasures in the work of the teacher. In the autumn term the full results of the home projects are reported and discussed in the class.

Household Science

This sketch must not be concluded without reference to the efficient household science department of the school. This department is conducted to give the girls of the school a course corresponding to agriculture for the boys, and it is exceptionally popular with both students and general public. As our space in the school building is limited the school board rent the sabbath school room and two or three adjoining rooms of a church across the street from the high school. These rooms they have equipped with all necessary apparatus for teaching cooking, sewing, and laundry work. As to the disposal of the products we do not find much difficulty. A good deal of the cookery is eaten by the girls at the close of each lesson, and no cases of illness therefrom have as yet been reported. Receptions to school board, visiting basket ball teams, and other organizations are held and in this way not only are the viands

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made to rapidly disappear but also the art of serving is taught. Frequently dishes are prepared for charitable purposes and distributed to proper author-

ities or to deserving poor families. In the latter methods of distribution the girls undoubtedly find their highest satisfaction and enjoyment.

SAMPLE CONSTITUTION FOR A COMMUNITY BIRD CLUB

Article I

NAME

This Club shall be known as the
.....

Article II

PURPOSE

The purposes of this Club shall be to encourage protection of and interest in bird life in our community.

Article III

MEMBERSHIP

Section 1. The membership in this Club shall consist of Active Membership, Active Family Membership, Associate Membership, Life Membership, Patrons, and Benefactors.

Section 2. Any resident of the
. may become an Active Member on Payment of the prescribed dues.

Section 3. Any family residing in . .
. may obtain a Family Membership on payment of the prescribed dues.

Section 4. Any non-resident in sympathy with the purpose of this Club may become an Associate Member on payment of the prescribed dues.

Section 5. Any person may become a Life Member on payment of the prescribed fee.

Section 6. Any person may become a Patron on payment of the prescribed fee.

Section 7. Any person may become a Benefactor on payment of the prescribed fee.

Section 8. The dues for Active Members shall be payable annually.

Section 9. The dues for Active Family Members shall be payable annually.

Section 10. The dues for Associate Membership shall be payable annually.

Section 11. The fee for Life Membership shall be

Section 12. The fee for a Patron shall be

Section 13. The fee for a Benefactor shall be

Section 14. The voting power shall be limited to active members.

Article IV

MEETINGS OF THE CLUB

Meetings shall be held at the discretion of the Executive Committee.

The first meeting after shall be the business meeting at which the selection of officers for the ensuing year shall be held.

Article V

GOVERNMENT

The officers of the Club shall consist of a President, Vice-President, Secretary, and General Manager. The officers of the Club shall constitute the Executive Committee, which committee shall pass upon all business that is to be brought before the Club for action.

From *Wild Bird Guests—How to Entertain Them*, by Ernest Harold Baynes; Published by E. P. Dutton & Co., New York.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes

INSTRUCTION IN IRRIGATION FARMING ON ALBERTA IRRIGATION PROJECTS

BY DON H. BARK, SUPFRINTENDENT, IRRIGATION INVESTIGATION BRANCH, DEPARTMENT OF NATURAL RESOURCES, CANADIAN PACIFIC RAILWAY

THE Canadian Pacific Railway has constructed and is operating three irrigation projects in Southern Alberta. These projects are located as follows: The southern and the smallest project, consisting of approximately 200,000 acres of irrigated land, secures its water supply from the St. Marys river. The irrigated land is located in the vicinity of Lethbridge, Coaldale, Magrath and Raymond.

The western section project diverts its water from the Bow river within the city limits of Calgary. Irrigated lands of this project consist of approximately 300,000 acres, located on both sides of the Canadian Pacific Railway main line from Calgary to a short distance east of Cluny, a distance of over 100 miles.

The eastern section project contains some 400,000 acres of irrigable land. Water for the irrigation of this project is diverted from the Bow river near the town of Bassano. Lands of this project lie between the Red Deer river on the north and the Bow river on the south and extend from the town of Bassano on the west to within a short distance of Alderson on the east.

Considered as a whole, these three irrigation projects are among the largest, if not the largest, irrigation projects on

the North American continent. The southern project near Lethbridge and the western section project have now been settled and practically all land sold and cultivated for some years. The more recently constructed eastern section project is now in course of settlement and development.

The agricultural practices best adapted to the peculiar soil, climatic, and economic conditions obtaining under these three projects, were, of course, not well understood at the outset, and have required some little investigation and experimentation in order to evolve systems of cropping, cultivation, and handling best adapted to the existing conditions. There had never been any irrigation development on such a large scale so far north under comparable climatic conditions previous to the initiation of these projects. The varieties of crops, the dates, methods, and rates of planting, as well as the exact irrigation practices to follow, therefore, could not necessarily be patterned after those in vogue in California, Arizona, or Idaho.

Settlers for these three projects have been secured from all parts of the world, but the majority have moved from various parts of the United States. A small

portion of these settlers were not even farmers to start with and the majority of them were unfamiliar with irrigation, even in the milder parts of the United States. When these facts are taken into consideration, the success obtained has been phenomenal, but it is quite easy to understand that the best agricultural and irrigation practices have had to be evolved by trial, investigation, and experimentation as previously outlined.

In order to expedite the solution of the many problems that confronted the irrigation farmers of Alberta under the peculiar conditions obtaining on the irrigated lands of this province, the Natural Resources Department of the Canadian Pacific Railway inaugurated the Irrigation Investigation Branch which at present has headquarters at Brooks. This town is centrally located in the eastern section project, the most recent of the three irrigation projects previously described.

This branch consists of a staff of trained agricultural and irrigation experts, the majority of whom have had several years of training and experience on the best irrigation projects in the United States. These men's work covers all three of the Canadian Pacific Railway irrigation projects and is much the same as is being carried out by the Agricultural Representatives in Eastern Canada and the County Agents in the United States.

Demonstration Farms and Experimental Plots, advantageously located, are also being operated. A large number of Farmers' Institutes, demonstrations, experiments, etc., are also carried on every year in these projects, and it is remarkable how rapidly the districts embraced

in the projects are being developed. Yields of crops of a large number of varieties are repeatedly being made that cannot be excelled or hardly duplicated even on the older, more completely developed irrigation projects in the United States.

The crops so far grown have consisted largely of wheat, barley, oats, flax, potatoes, alfalfa, and timothy. During the past four years, however, a large number of other crops have been rapidly introduced and have given excellent returns. These consist of mixed grasses, sunflowers, corn, field peas, alfalfa seed, clover seed, pumpkins, squash, etc., including a large variety of garden crops. The yields secured of the small leguminous seeds have been phenomenal. Alfalfa seed yields as high as ten bushels per acre, twelve bushels of alsike clover seed per acre, eight bushels of red clover seed, fifty bushels of corn, and fifty bushels of field peas per acre are not uncommon. That the quality of these seed crops is equal to the best is evidenced by the large number of prizes these seeds have won at the Chicago Hay and Grain Show, Idaho State Seed Show, and Provincial Shows of both Alberta and British Columbia.

It is felt that these irrigation projects are only in the initial stages of their development when the quality and quantity of the large variety of crops that is possible is taken into consideration, and it is believed that the experiments, demonstrations, and agricultural educational work that has been carried on by the Natural Resources Department of the Canadian Pacific Railway is in no small way responsible for the rapidity of the development that has taken place and the success of the settlers who are located on these projects.

FERTILIZER ANALYSIS

Instructions for submitting samples of Fertilizers for Analysis

THE attention of purchasers of fertilizers is called to section 10 of the Fertilizers Act of 1909, as amended in 1919, which provides that:

(10) (1) Any purchaser of a registered fertilizer may obtain an analysis of such fertilizer by making application therefor to the Minister of Health; a sample of at least one pound weight of the fertilizer taken in accordance with the directions given in Schedule B to this Act must accompany the application and also a fee of one dollar. The certificate of the analyst shall be accepted as legal evidence in the courts.

(2) The application for an analysis may be made in the form following:

To the Minister of Health.

I beg to apply for an analysis of a fertilizer purchased by me at.....in the county of.....in the province of.....on the.....day of 19.....

Accompanying this application is a one-pound sample of the said fertilizer, the sample having been taken by me in the manner prescribed by the regulations, and the fee of one dollar.

Name of applicant.....

Address of applicant.....

Date

Samples for examination from the provinces of Nova Scotia, New Brunswick and Prince Edward Island, should be forwarded to the Analyst in Charge, 52 Bedford Row, Halifax, N.S.

Samples from the province of Quebec to the Analyst in Charge, 2 Place d'Youville, Montreal.

Samples from the province of Ontario to the Chief Analyst, Department of Health, 317 Queen St., Ottawa.

Samples from the provinces of Manitoba and Saskatchewan to the Analyst in Charge, Magnus Ave. and Main Street, Winnipeg.

Samples from the provinces of Alberta and British Columbia to the Analyst in Charge, 326 Howe Street, Vancouver.

Samples of fertilizers submitted by a purchaser for analysis must be enclosed in glass jars or bottles, and properly sealed. The samples must be taken in the presence of the vendor or of his representative.

Process of Sampling

In lots of five tons or less, portions shall be drawn from each separate package, and from at least ten packages; or if less than ten packages are present, all shall be sampled. In lots of over five tons, at least ten per cent of the packages shall be sampled. The portions so taken shall be thoroughly mixed in the presence of the parties interested, and from this mixture the sample sent to the Minister is to be taken; and must bear the signature of vendor and purchaser; and at the same time a duplicate sample is to be left with the party whose goods are inspected, subject to the call of the manufacturer or agent.

Observance of the privilege accorded to purchasers by the above, affords the best protection against fraud and loss. The actual work of analysis costs about \$10 to this department, but is performed for one dollar to the purchaser of a fertilizer for his own use. This, of course, is in the interest of Canadian agriculture; and the purchaser of even a single ton of material will find it well worth his while to take advantage of the privilege.

A certificate, acceptable as evidence in the courts, is furnished to him and he is thus able to protect himself against being defrauded, and to recover damages, should the article as supplied to him be found below the guarantee under which it is registered and sold.

Action should be taken at the time of purchase of the fertilizer, and not at the end of the season, for reasons that will be apparent to any one who gives

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thought to the matter. It too frequently happens that, only after the season's crop has been lost, the purchaser seeks redress. Usually, in such case, a trustworthy sample cannot be secured, since unless the fertilizer has been kept under

satisfactory conditions, it may have spontaneously changed character, more or less in the interval; and the sample as supplied for analysis may not truly represent the article as originally supplied by the vendor.

STATISTICS OF CHEESE AND BUTTER PRODUCTION IN CANADA

FACTORY CHEESE PRODUCTION IN CANADA BY PROVINCES

Province	1915	1916	1917	1918	1919
	Lb.	Lb.	Lb.	Lb.	Lb.
P.E.I.	2,260,000	2,121,736	2,234,985	2,201,368	2,472,563
N.S.	125,580	94,727	67,497	61,195	47,360
N.B.	1,165,651	1,185,664	1,244,106	1,185,225	1,252,849
Que.	54,217,113	61,906,750	67,835,017	62,070,162	58,044,719
Ont.	125,001,136	126,015,870	121,173,086	107,886,724	103,320,041
Man.	726,725	880,728	1,003,646	657,585	423,855
Sask.				13,573	35,452
Alta.	381,632	745,122	1,274,905	552,834	520,530
B.C.	10,000	18,000	71,094	249,647	304,502
Totals.	183,887,837	192,968,597	194,904,336	174,878,313	166,421,871

THE PERCENTAGE PRODUCTION OF CHEESE AND BUTTER BY PROVINCES IN 1919

Province.	Cheese	Butter
P.E.I.	1.49	.87
N.S.	.03	2.03
N.B.	.75	.88
Que.	34.88	36.27
Ont.	62.08	32.63
Man.	.26	7.96
Sask.	.02	6.37
Alta.	.31	11.38
B.C.	.18	1.61
	100.00	100.00
West of Great Lakes.	.77	27.32
East of Great Lakes.	99.23	72.68

NEWS ITEMS AND NOTES

Less than fourteen years ago all the creameries in Saskatchewan did not produce 100,000 pounds of butter, and last year more than 6,000,000 pounds of creamery butter was made in Saskatchewan, the output doubling every three years in that period.

From a humble beginning with 460 members in 1913, Manitoba at the end of 1919 had enrolled upwards of 30,000 boys and girls in these movements. In Saskatchewan their growth has been slower, but they are now gaining ground rapidly.

Mr. W. F. Stephen, Secretary of the Canadian Ayrshire Breeders' Association, reports that at least 75 per cent of enquirers for Ayrshire bulls insist that they shall be from high-producing ancestors.

The Library of the Dominion Department of Agriculture reports during the year 1920-21 the receipt of the following publications: Pamphlets, 10,692; periodicals, 12,561; bound volumes, 1,345.

The card catalogue now contains approximately 215,000 cards. The total number of books loaned or applied for was 3,090.

One million dollars is the enormous amount which the farmers of the three Prairie Provinces have paid during the last three years for the transportation of weed seeds to Fort William and Port Arthur.

Mr. Arthur Gibson has recently been appointed a member of the Lyman Entomological Bequest Committee, and attended a meeting of the Committee held at McGill University, Montreal, in February.

A representative of the Entomological Branch who visited the Corn Borer area in Ontario early in February and made field observations, reports that on examining larvæ hibernating in stubble he found the mortality was only 7.6%. A careful examination of ensilage which was collected in a field severely infested by the borer last summer, yielded no trace of borers.

Some interesting reports have been received from commercial growers of cabbages in the United States, reporting the success that has followed the adoption of the corrosive sublimate remedy for the control of the Cabbage Root Maggot. The Chief of the Entomological Branch has estimated that during 1920 this method of control was worth at least \$50,000 to the market gardeners of Ontario alone.

The Dominion Horticulturist, Mr. W. T. Macoun, gave an address on Ornamental Trees and Shrubs and the Planting of City Streets and Public Places, at a meeting of the Chesterville, Ontario, Horticultural Society, on March 29.

The meetings of the Niagara Peninsula Fruit Growers' Association at Winona, Grimsby, St. Catharines, and Vineland on February 23 and 24, were attended by Mr. W. T. Macoun, Dominion Horticulturist, who gave an address on "The work of the Horticultural Division and New Varieties of Bush Fruits."

At the annual meeting of the Quebec Society for the Protection of Plants held at Macdonald College, Quebec, the following addresses or papers were presented by members of the Entomological Branch staff:

"The Organization of the Entomological Branch", A. Gibson;

"The Discovery of the European Corn Borer", L. S. McLaine.

"Spraying versus Dusting", C. E. Petch;

"Chemical Investigation of Sprays", A. Kelsall.

The lowering of production costs by increased efficiency was stated by Deputy Minister Auld at the Saskatchewan Dairy Convention, to be the most important question now affecting all industry. With dairying, three essentials to reduce production costs are breeding, feeding and weeding. It is not sufficient to have the right breed of cows, a sufficient quantity of the right kind of feed produced at a reasonable price, but ruthless weeding of the boarders in the herd must be practised by all successful dairymen.

The assistance given the dairy industry by the live stock purchase and sale work of the live stock branch of the Saskatchewan

Department of Agriculture, was outlined by J. G. Robertson, provincial live stock commissioner at the Dairymen's annual Convention. This work has been carried on since 1913, and is increasing in importance every year. Last year twelve carloads of dairy cattle were purchased in Ontario by an expert from the live stock branch, and were sold to dairy farmers on credit terms, a few choice Holstein and Ayrshire bulls also being brought in.

Percy E. Reed, dairy commissioner for Saskatchewan is responsible for the statement that while there was a decrease of 19,455 cows in the province in 1920, there was an increase of 40,000 pounds in the creamery output. The total value of dairy products for the year in the province was estimated at over \$23,000,000, an increase of about half a million dollars over the previous year. There are now 47 creameries operating in the province, 44 of these having their butter graded by the provincial graders. Over half a million pounds more of government graded creamery butter was sold in 1920 than in the previous year.

The Director of the Homemaker's Department of the University of Saskatchewan, Miss Abbie DeLury, states that the Gazette was in error in attributing to her the article on Leadership which appeared in last issue. The article in question although forwarded to us by Miss DeLury, was written by Miss Esther Thompson, assistant director, and should have been so credited.

A series of lectures on horticultural subjects extending from the middle of February to the first week of March was held throughout the Okanagan Valley, B.C. The superintendent of the Okanagan Experimental Station, Mr. R. H. Helmer, who addressed the meetings, reports an attendance of 3,316 persons.

Preparations are being made by the Department of Extension of the University of Alberta for the third annual Conference for farm young people to be held during the month of June under the joint auspices of the University, the United Farm Women and the United Farmers of Alberta.

"University Week for Farm Young People" will be held at the Alberta University at South Edmonton from June 8 to 14 inclusive. Delegates will be housed in the dormitories and board and room for the week will be

furnished at a nominal cost. Accommodation is available for 250. The programme, occupying the full week, will consist of a well balanced course of lectures on subjects of special value and interest to young farm people, nature study tramps, wholesome recreation in the form of group games and physical drill, moving pictures, community singing, and visits to the Parliament Buildings and other places of interest.

Mr. W. T. Macoun, Dominion Horticulturist, has been elected Canadian vice-president of an international federation of horticultural industries. The president is Professor L. H. Bailey of Ithaca, New York; first vice-president, C. J. Tyson, of Floradale, Pa., and acting secretary, Professor R. B. Cruickshank of the Ohio State University. Manufacturers of spray pumps and insecticides, nurserymen, apple growers, peach growers and horticultural societies are represented on the executive committee. This organization provides for merging the federated horticultural industries into the enlarged American Pomological Society which is to be a clearing house of all the industries interested and allied with horticulture, including representation of big fruit exchanges, marketing organizations, State Horticultural Societies, fruit growers from all the States and Canada, spray machinery manufacturers, spray material manufacturers, nurserymen and others.

CONFERENCE OF SASKATCHEWAN AGRICULTURISTS

An important conference of federal and provincial officials engaged in instructional, experimental or administrative work in agriculture was held at the University of Saskatchewan on April 12, 13 and 14. The conference, which was called by the provincial Minister of Agriculture, the Hon. C. M. Hamilton, had for its object a discussion of the province's agricultural problems, and the further development of the agencies through which they might be dealt with effectively.

A comprehensive programme was prepared by F. H. Auld, Deputy Minister of Agriculture and Dean Rutherford of the College of Agriculture, covering every phase of agricultural development. Both Dominion and provincial leaders in the various spheres of work gave addresses and took part in the discussions. It was regarded as appropriate that this gathering for the promotion of the agricultural interests of the province should be held at the close of the first decade in the history of the College of Agriculture.

The appointment is announced of Mr. H. L. Seamans as Entomologist for the Province of Alberta, with Lethbridge as his headquarters. Mr. Seamans has had considerable experience in grasshopper and cutworm outbreaks, having devoted several years to this work during the time of his connection with the Montana Department of Agriculture. The Entomological Branch is fortunate in securing such a capable officer to continue these investigations, which were started by Mr. Strickland, who now has charge of the Stored Products investigations.

The season's Brown Tail Moth work concluded in New Brunswick on March 4, and in Nova Scotia on March 26. The total number of nests found in the latter was 558.

Reports to hand indicate the Brown Tail Moth is increasing rapidly in certain sections of Massachusetts and New Hampshire, and that the Gipsy moth situation in New Hampshire is also serious. There appears to have been little or no winter killing of the eggs during the past winter on account of the mildness of the weather, and it is anticipated that there will be a large outbreak this summer.

Students specializing in agriculture at the Macdonald College recently organized a live stock club to discuss matters in which they are especially interested. The Club held recently a mock consignment sale of dairy cattle, issued catalogues containing pedigrees, etc., and themselves prepared certain of the college live stock for the sale. This was conducted by an auctioneer, and the bidding of the students on the animals presented was treated as an indication of their knowledge of values at the spring examination. The event proved to be quite a success, the students bidding eagerly and yet with caution.

Following the event a supper was held at which the Principal, Dr. Harrison, gave an address, followed by Professor Barton, who discussed sale-ring methods in this country as contrasted with those in Scotland.

During February meetings in Ontario were addressed by officers (including Mr. P. J. Carey, Fruit Packing and Orchard Specialist and Mr. J. R. Hastings, District Fruit Inspector for Western Ontario) of this Branch, co-operating with the Agricultural Representatives of the province. Co-operative organization and other matters of special interest to fruit growers and shippers were discussed and practical demonstrations given of proper methods of grading and packing. In some cases packing classes were held. The points covered by these meetings were: St. George, Lucknow, Dungannon, Watford, Wyoming, Milton, Palermo, Nelson, Chat-

ham, Port Hope, Marshville, Welland and Aurora.

In British Columbia, Mr. R. G. L. Clarke, District Fruit Inspector, accompanied the Provincial Department of Agriculture officials on a short-course tour throughout the fruit section. Meetings were held at the following points: Keremeos, Oliver, Naramata, Penticton, Summerland, Kelowna, Oyama, Vernon, Woods Lake, Okanagan Centre, West Bank, Peachland, Salmon Arm and Armstrong. Mr. T. H. Bain, Fruit Inspector at Vancouver, also assisted the provincial authorities at meetings throughout the Lower Mainland potato district.

At the request of the Nova Scotia Shippers' Association, Mr. McIntosh attended a sitting of the Board of Railway Commissioners at Moncton, March 7 and 8.

The New Brunswick Fruit Growers' Association Annual Meeting, held at Fredericton on March 30 and 31, was attended by Mr. G. H. Vroom, District Fruit Inspector for the Maritime Provinces, Mr. W. S. Potts and Mr. W. P. Fox, Dominion Fruit Inspectors in New Brunswick. Mr. Vroom gave an address on "Packing and marketing apples in the Maritime Provinces." Sixty interested fruit growers were in attendance, and the convention was one of the most successful in the history of the association.

On the application of the Canadian National Poultry Association, the Minister of Agriculture has authorized Canada's participation in the World's Poultry Congress to be held at The Hague, September 6 to 13, 1921. The Minister has intimated his willingness to meet the necessary expenses, which will include half of the World's Poultry Congress organization expenses allotted to America, expenses of delegates, and the cost of sending an exhibit of birds. The Congress is being held under the patronage of their Majesties, the Queen and Queen-Mother of the Netherlands.

The British Columbia Department of Agriculture recently appointed Mr. Frederick Overland as Dairy Instructor. Mr. Overland, who is a native of Peel County, Ontario, served for two years overseas. He has done both practical and experimental work in butter-making, and for some time was analyst for the Union Milk Company of Calgary. Another ex-service man recently appointed by the Department is Mr. R. P. Murray who has been made Field Inspector in the Horticultural Branch. Mr. Murray, who is a graduate of the Ontario Agricultural College, was formerly a supervisor with the Soldier Settlement Board in British Columbia.

APPOINTMENTS AND STAFF CHANGES

G. B. Pippy, Inspector of Dairy Products under the Dairy and Cold Storage Branch, for the Maritime Provinces with headquarters at Truro, N.S., and P. C. Kidd, Inspector of Dairy Products, under the Dairy and Cold Storage Branch, for Alberta and British Columbia, with headquarters at Edmonton, Alta., severed their connections with the Branch at the end of March. Examinations have already been held by the Civil Service Commission for the selection of successors to these two officials. The services rendered

by both Mr. Pippy and Mr. Kidd have been very satisfactory and the Branch is unfortunate in losing them.

Mr. H. W. Coleman, who early in August, 1920, joined the staff of the Dairy and Cold Storage Branch as Dairy Produce Grader at Montreal, has tendered his resignation. Mr. Coleman is engaging in the creamery business at Carleton Place, Ontario.

ASSOCIATIONS AND SOCIETIES

CANADIAN AYRSHIRE BREEDERS' ASSOCIATION

The Fifty-first Annual Convention of the Canadian Ayrshire Breeders' Association was held in Montreal on March 23 and 24. Approval was given to a reciprocal arrangement with the Ayrshire Breeders' Association of the United States by which animals recorded in the herd books of either country will be accepted by either association without the further recording of ancestors. An amendment to the Income Tax Bill was recommended to provide that when a pure bred animal reaches the age of eight years, twenty per cent annually be written off her value. The policy of retiring each year two directors having the longest service with the board and their replacement by younger men, was approved. The Association decided to appoint a field man who will devote himself exclusively to the promotion of the Ayrshire breed of cattle in Canada. Other resolutions included recommendations for expediting the accredited herd work of the Federal department, and for the safeguarding of the tuberculin supply. President, Gilbert McMillan, Huntingdon, Que.; Vice-president, Wm. Hunter, Spencer, Mass.; Secretary-treasurer, W. F. Stephen, Huntingdon, Que.

ROYAL AGRICULTURAL WINTER FAIR

The annual meeting of the Royal Agricultural Winter Fair took place in Toronto on March 2. It was reported that the original plans for the building to accommodate the Fair had been found too costly and that

others had been substituted, to cost one million dollars, which it was believed would answer every purpose so far as accommodation was concerned. The city of Toronto has voted \$1,000,000 to erect the building and the Association undertakes to pay the city \$40,000 a year for ten years. It is also provided that a show shall be held annually for ten years with an annual prize list of not less than \$40,000, making it necessary for the Association to raise \$80,000 per annum. The Breed Associations are being asked to contribute sufficient money to make up this sum. Already a number have expressed their willingness to contribute their share and it is expected that the majority of them will respond.

It is expected that building operations will begin in April and that the first Royal Show will be held in December next. The precise dates have not yet been definitely settled but the time set will probably be immediately preceding or following the International at Chicago.

The following are the directors elected for the present year:—

Honorary: The Dominion Minister of Agriculture; the Ontario Minister of Agriculture; the Mayor of Toronto; the Vice-chairman, Board of Control, Toronto.

Horses.—John A. Boag, Queensville; Peter Christie, Manchester; Geo. Pepper, Toronto; S. McBride, Toronto; E. C. H. Tisdale, Beaverton.

Beef Cattle.—J. M. Gardhouse, Weston; L. O. Clifford, Oshawa; H. M. Pettit, Freeman.

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Dairy Cattle.—John McKie, Norwich; D. O. Bull, Brampton; G. S. Gooderham, Clarkson.

Dairy Products.—G. A. Gillespie, Peterboro; G. A. Putnam, Toronto; E. H. Stonehouse, Weston.

Sheep.—R. McEwen, London; J. D. Brien, Ridgetown; W. A. Dryden, Brooklyn.

Swine.—J. E. Brethour, Burford; H. A. Dolson, Cheltenham; Wm. Jones, Mt. Elgin.

Poultry.—Geo. Robertson, Ottawa; J. S. Greenshields, Toronto; J. H. Saunders, London.

Fruit and Vegetables.—C. W. Baxter, Ottawa; David Allan, Grimsby; F. F. Reeves, Humber Bay.

Horticulture.—W. J. Evans, Toronto; G. M. Geraghty, Toronto; Thos. Manton, Toronto.

Women's Interests.—Miss H. Beardmore, Port Credit; Mrs. W. N. Glenn, Hensall.

Seeds.—Geo. H. Clark, Ottawa; J. J. Morrison, Toronto; J. Lockie Wilson, Toronto.

Bee-keepers.—H. G. Sibbald, Toronto.

Financial Subscribers.—H. C. Cox, Oakville; Wm. Inglis, Toronto; Harry McGee, Toronto; Alfred Rogers, Toronto.

Abattoir and Stock Yards.—F. C. Fletcher, E. C. Fox, James Harris, all of Toronto.

At a subsequent meeting of the new Board of Directors the following executive officers were elected:—

President, W. A. Dryden; Vice-President, H. C. Cox; Executive Committee: E. H. Stonehouse, Harry McGee, J. J. Morrison, Geo. Pepper, F. C. Fletcher; Managing Director, C. F. Bailey.

NATIONAL DAIRY COUNCIL

At the annual meeting of the National Dairy Council held in Toronto in April, twenty-one resolutions were passed covering a wide range of subjects of importance to the dairy industry. These were briefly as follows:—

Favouring the institution of an equitable arrangement between Canada and the United States for trading in dairy products; to co-operate between producers and manufacturers of dairy products; for the grading of all dairy products exported from Canada; endorsement of the Ontario Dairy Standards Act; for a silo-building campaign in Western Canada, with such silage crops as peas and oats, corn and sunflowers; against a raise in rates on cream and milk in baggage cars on the Intercolonial railway; appointing a committee to discuss standardized milk and cream cans and other equipment; against the proposed Fordney Bill regulations in regard to dairy products entering the U.S. from Canada; for a campaign of education as to milk values as food; for a reduction in ocean rates on butter and cheese, to promote export; endorsing the use of pure bred sires in the herds of Canada; for \$250 in prizes for the

Dominion educational butter scoring contest of the Dominion Dairy Branch; for higher valuation on grade cattle slaughtered after reacting to tuberculin test; for the compulsory pasteurization of milk for use in cities; approval of new plan for financing National Dairy Council; supervision by Federal Government of a contagious abortion and similar cures placed on the market; recognition of a right of Western Canada Dairy Manufacturers' executive to nominate Western representatives of Cheese, Butter and Milk distributing interests; approval of the Feeding Stuffs Act; for more strict regulation of oleomargarine; approval of work of Dairy Branch officials; and urging larger salaries for them.

The officers elected for the ensuing year were:—President, E. H. Stonehouse; Vice-President, Alex. McKay, Winnipeg; Executive Committee: P. Palleon, Calgary; J. W. Berry, British Columbia; M. F. Logan, Regina; Auguste Trudel, Montreal; Capt. Hugh Dickson, Nova Scotia; George Smith, Iroquois, Ont., and John Bingham, Ottawa.

DOMINION SHORTHORN BREEDERS' ASSOCIATION

The following directors were appointed for the Dominion Shorthorn Breeders' Associations for 1921: Ontario—A. List: James Douglas, Caledonia; J. A. Watt, Elora; A. G. Farrow, Oakville; and Gordon Ault, Moffat. D. List: J. Kyle, Drumbo; George Gier, Baltimore; T. R. Amos, Moffat; and J. Gardhouse, Weston. Manitoba—J. G. Washington, Ninga; John Strachan, Pope. Saskatchewan—R. A. Wright, Drinkwater, and E. R. Mooney, Weyburn. Alberta and British Columbia—W. Sharp, Lacombe, and J. C. Yule, Carstairs.

CANADIAN-BELGIAN DRAFT HORSE-BREEDERS' ASSOCIATION.

At the annual meeting of the Canadian Belgian Draft Horse Breeders' Association held recently the following officers were elected for 1921:—Hon. Presidents, Dr. Tolmie, Dominion Minister of Agriculture, Hon. J. E. Caron, Minister of Agriculture for Quebec; president, G. W. Gurney, Paris, Ont.; Vice-president, Dr. J. H. Vegneault, Que.; R. G. T. Hitchman was appointed secretary-treasurer.

CANADIAN CO-OPERATIVE WOOL GROWERS, LIMITED

At the annual meeting of the Canadian Co-operative Wool Growers held recently the manager in his report stated that during the year the company handled a total of 5,146,437 pounds of wool and pelts, 40,025 pounds of this amount being pelts. About 40 per cent of what had been sold had gone to Canadian mills.

The following were the officers and directors elected for 1921:—President, Col. Robt. McEwen, London, Ont.; 1st Vice-President, J. W. Renton, Calgary, Alta.; 2nd Vice-President, S. A. Logan, Amherst, N.S.; General Manager, G. E. O'Brien; Secretary, G. O'Neil. The Head Office of the company is at 128 Simcoe Street, Toronto, Ont.

CANADIAN NATIONAL LIVE STOCK RECORDS BOARD

At the annual meeting of the Canadian National Live Stock Record Board, held in Toronto recently, representatives were present from Alberta, Manitoba, Ontario, Quebec and the Maritime Provinces.

According to the annual report, the total number of pedigrees recorded in 1916 was 54,066 as compared with 74,113 in 1920. The total receipts from fees in 1916 was \$29,328.43. In 1920 the total receipts from the same source was \$157,176.66.

A resolution was adopted asking for an increased grant from the Dominion.

The committees for 1921 are as follows: Chairman, Peter White, K.C., Toronto; Heavy Horses, Lt.-Col. McEwen, London, Ont.; Dairy Cattle, W. F. Stephen, Huntingdon, Que.; Beef Cattle, Robert Miller, Stouffville, Ont.; Light Horses, Victor Sylvestre, St. Hyacinthe, Que.; Sheep, J. M. Gardhouse, Weston, Ont.; Swine, J. E. Brethour, Burford, Ont.; Secretary-Treasurer Jno. W. Brant, Ottawa.

THE CANADIAN AGRICULTURAL AND EXPERIMENTAL UNION

The officers of the Ontario Agricultural and Experimental Union for the year 1921 are as follows:—President, J. B. Spencer, Ottawa; Vice-President, J. W. Diddifield, M.P.P., Uxbridge, Ont.; Secretary, C. A. Zavitz, Agricultural College, Guelph.

EASTERN CANADA LIVE STOCK UNION

The various live stock associations of eastern Canada were represented by delegates at the Annual Meeting of the Eastern Canada Live Stock Union held in Toronto in March last.

Resolutions were passed regarding railway rates to fairs and exhibitions, and asking the securing of better rates from the railways be placed upon a better basis; that representation to the union from the various organizations be increased from one to three, and that the executive committee be empowered to invite other organizations which in its judgment might be of value to the union and the live stock industry to join the Association. The suggestion to have the proceedings of the annual meeting

published in the annual report of the Live Stock branch of the Ontario Department of Agriculture was adopted.

Officers were elected as follows:—Hon. President, John Gardhouse, Weston; President, J. D. Brien, Ridgetown; 1st Vice-President, C. W. Gurney, Paris; 2nd Vice-President, R. R. Ness, Howick, Que.; 3rd Vice-President, F. E. Fuller, Truro, N.S.; Secretary-Treasurer, H. D. Smith, Ancaster, Ont. Executive: Horses, Geo. Pepper, Toronto; Cattle, R. W. E. Burnaby, Jefferson; Sheep, Peter Christie, Manchester, Ont.; Swine, J. E. Brethour, Burford, Ont.; Poultry, J. H. Saunders, London. Messrs. C. W. Gurney, John Gardhouse and Peter Christie were elected representatives to the Royal Agricultural Winter Fair.

NEW BRUNSWICK FARMERS' AND DAIRYMEN'S ASSOCIATION

The forty-fifth annual meeting of the New Brunswick Farmers' and Dairymen's Association opened in Fredericton on March 8.

Resolutions were passed in favour of the establishment of a second federal experimental station in the northern part of the Province, for the benefit of the northern societies; In favour of the inspection and sale of fertilizers being brought under the control of the Seed Branch of the Dominion Department of Agriculture.

The following officers were chosen for the ensuing year: President, Arthur J. Gaudet, St. Joseph; First Vice-President, W. E. Wallace, Penobsquis; Second Vice-President Thos. W. Riordan, Grand Anse; Corresponding Secretary, Alexander J. Doucet, Notre Dame; Recording Secretary, K. M. Fiske, East Florenceville.

QUEBEC SOCIETY FOR THE PROTECTION OF PLANTS

The thirteenth annual meeting of the above society was held at Macdonald College, Quebec, on March 1, 1921.

The officers for the ensuing year are as follows: President, Prof. W. Lochhead, Professor of Zoology and Entomology, Macdonald College; Vice-President, Rev. Father Leopold, Director Oka Agricultural College; Secretary-Treasurer, Prof. B. T. Dickson, Professor of Botany, Macdonald College.

ONTARIO HOLSTEIN BREEDERS ASSOCIATION

An association of the Holstein breeders of the Province of Ontario was formed recently with the object of promoting the interests of the breed. Arrangements will be made to provide a provincial herd at the forthcoming National Dairy Show,

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Chicago. The following officers were elected:—President, W. R. Cumming, Cummings Bridge; Vice-President, W. H. Cherry, Hagersville; Secretary-Treasurer, C. Houck, Chippawa.

ONTARIO AGRICULTURAL COLLEGE ALUMNI ASSOCIATION

At a meeting of ex-students of the Ontario Agricultural College held at Guelph on March 10, proceedings were taken to organize the Provincial O.A.C. Alumni Association.

The objects are to establish a fraternity of ex-students of the O.A.C., to stimulate social and economic progress in rural life, to co-ordinate the efforts of those engaged in practical and professional agriculture, and to promote agricultural education, co-operation and leadership.

The constitution and by-laws were adopted by the gathering and the following officers elected for the coming year; President, C. F. Bailey; Vice-President, W. P. Gamble; Directors: Eastern Ontario, A. P. MacVannell, J. W. Kennedy, W. R. Reek; Western Ontario, W. H. Porter, G. G. Bramhill, H. K. Revell; Northern Ontario, Chas. Laidlaw, L. M. Davis, T. Jarvis, Central Ontario, J. B. Fairbairn, F. N. Marcelles, J. Widdifield.

MANITOBA CO-OPERATIVE SOCIETIES

The first convention of the Co-operative Societies of Manitoba was held in Winnipeg on February 9th, 1921. The convention

agreed, subject to ratification by the constituent societies represented, to establish a federation of the co-operative societies for the province.

The election of officers for the federation resulted as follows:—

President, R. S. Ward, Winnipeg; Vice-President, W. Tompkins, Glenella; Sec.-Treas., C. T. Tipper, Winnipeg.

SASKATCHEWAN DAIRY ASSOCIATION

The annual convention of the above association was held in Prince Albert on February 9 and 10. The dairy cattle judging competition, open to teams of three boys or girls of eighteen years of age or under, was an outstanding feature.

Resolutions were passed favouring legislation in cities making it compulsory that all milk sold wholesale or retail be scientifically pasteurized; requesting the Provincial Government to conduct investigations to ascertain the cost of producing milk in Saskatchewan, to adopt necessary regulations to make buying of cream according to grade compulsory, to assist in financing the purchase of silos by dairy farmers; and requesting the federal government to increase compensation for cattle destroyed for tuberculosis.

The following were elected as officers of the association for the ensuing year:—President, O. W. Andreassen, Humboldt; Vice-President, R. J. Underwood, Saskatoon; Secretary-Treasurer, P. E. Reed, Department of Agriculture, Regina.

THE LIBRARY

LIST OF MAJOR PUBLICATIONS RECENTLY ADDED TO THE DEPARTMENTAL LIBRARY, INTERNATIONAL INSTITUTE BRANCH, DEPARTMENT OF AGRICULTURE, OTTAWA.

The Vegetable Garden, by MM. Vilmorin-Andrieux; English edition, published under the direction of William Robinson. London, John Murray, 1920. (New York, E. P. Dutton & Co.)

Insect Pests and Fungus Diseases of Fruit and Hops, by Percival J. Fryer, F.I.C., F.C.S. Cambridge, University Press, 1920.

Roses; their History, Development and Cultivation, by Joseph H. Pemberton, Vice-President of the National Rose Society. 2d ed. New York, Longmans, Greene & Co., 1920.

Alcohol; its Production, Properties, Chemistry, and Industrial Applications, by Charles Simmonds, B.Sc., Analyst in the Government Laboratory, London. Toronto, Macmillan Co. of Canada, 1919.

Les insectes; anatomie et physiologie generales, par C. Houlbert, Professeur a l'Université de Rennes; 2eme ed. Paris, Octave Doin, 1920. 374 pp. illus. (Bibliothèque de zoologie).

Wild Flowers of New York, by Homer D. House, State Botanist, Albany, University of the State of New York, 1918. 2 vols. (State Museum, Memoir 15).

Landscape Gardening, by O. C. Simonds. Toronto, The Macmillan Co. of Canada

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1920. 338pp. illus. (The rural science series, ed. by L. H. Bailey).

The Dawn of a New Patriotism, by John D. Hunt, Clerk of the Executive Council, Alberta; 2d edition. Toronto, Macmillan Co. of Canada, 1918.

Rural Problems in the United States, by James E. Boyle, Ph.D., College of Agriculture, Cornell University. Chicago, A. C. McClurg & Co., 1921. 142pp. (National social science series).

A Community Center, what it is and how to organize it, by Henry E. Jackson, Special Agent in community organization, U.S. Bureau of Education. Toronto, Macmillan Co. of Canada, 1918.

Community Organization, by Joseph K. Hart, Professor of Education, Reed College. Toronto, Macmillan Co. of Canada, 1920.

Community Civics, by Jesse Field, formerly Superintendent of Schools, Page Co. Iowa and Scott Nearing, Professor of Social Science, Toledo University. Toronto, Macmillan Co. of Canada, 1917.

Educational Resources of Village and Rural Communities, edited by Joseph K. Hart, Professor of Education, Reed College. Toronto, Macmillan Co. of Canada, 1914.

Fairhope; the Annals of a Country Church, by Edgar Dewitt Jones. Toronto, Macmillan Co. of Canada, 1917. 212pp.

Farm Boys and Girls, by William A. McKeever, Professor of Philosophy, Kansas State Agricultural College. Toronto, Macmillan Co. of Canada, 1913. (The rural science series).

Modern Fruit Growing, by W. P. Seabrook. Chelmsford, W. Seabrook Sons, Ltd., 1919.

Dry Farming in Western Canada, by John Bracken, President, Manitoba Agricultural College. Winnipeg, Grain Growers' Guide, Ltd., 1921.

The Times Book of Canada. London, The Times, 1920. Map.

Sturtevant's Notes on Edible Plants, edited by U. P. Hedrick. Albany, J. B. Lyon Co. 1919. (New York Agricultural Experiment Station, Report, 1919, Part II).

Manitoba and the Great Northwest, by John Macoun, M.A., Dominion Government explorer of the Northwest. London, T. C. Jack, 1883.

The Garden Doctor; Plants in Health and Disease, by Frederick J. Chittenden, F.L.S., V.M.H., Director, Royal Horticultural Society's Experimental Gardens, Wisley. London, Offices of "Country Life," Ltd., 1920.

Selected Western Flora—Manitoba, Saskatchewan, Alberta, by B. J. Hales, B.A., Principal, Normal School, Brandon. Toronto, Macmillan Co. of Canada, 1919.

Making a Lawn, by Luke J. Doogue, Superintendent of Boston. Public Grounds Department, 1917.

How to Grow Vegetables, by Allen French. Toronto, Macmillan Co. of Canada, 1918.

The Garden that We Made, by the late Crown Princess of Sweden (the Princess Margaret of Connaught). London, Offices of "The Girls' Own Paper," 1920.

Poisons: Their Effects and Detection, by A. W. Blyth, M.R.C.V.S., and M. W. Blythe, B.A. (Cantab.), B.Sc. (London) F.I.C., F.C.S., etc., 5th ed. London, Charles Griffin & Co., Ltd., 1920.

Food Inspection and Analysis, by Albert E. Leach, S.B., revised and enlarged by A. L. Winton, Ph.D. 4th ed. New York, John Wiley & Sons, Inc., 1920.

Cyanamid; Manufacture, Chemistry and Uses, by Edward J. Franke, B.Sc. Easton, Pa., Chemical Publishing Co., 1913.

Bone Products and Manures, by Thomas Lambert, technical and consulting chemist. 2d ed. London, Scott, Greenwood & Son, 1913.

Processes of Flour Manufacture, by Percy A. Amos, Lecturer on Milling at the Manchester School of Technology. London, Longmans, Green & Co., 1920.

Examination of Water; Chemical and Bacteriological, by William P. Mason, Professor of Chemistry, Rensselaer Polytechnic Institute. 5th ed., New York, John Wiley & Sons, inc., 1917.

Standard Methods for the Examination of Water and Sewage, 4th edition; Boston, American Public Health Association, 1920.

Air, Water and Food from a Sanitary Standpoint, by A. G. Woodman, and J. F. Norton, both of Massachusetts Institute of Technology. 4th ed. New York, John Wiley & Sons, inc., 1914.

A Text-Book of Organic Chemistry, by E. De Barry Barnett, B.Sc., A. I. C. Lecturer in Organic Chemistry at the Sir John Cass Technical Institute. London, J. & A. Churchill, 1920.

Nature Study Agriculture; a Text-Book for Beginners, by William T. Skilling, M.S. Yonkers-on-Hudson, N.Y., World Book Co., 1920.

Elementary Agriculture, by James S. Grim, Ph. D., Keystone Normal School, Kutztown, Pennsylvania. Boston, Allyn & Bacon, 1916.

Agriculture and Gardening for Schools, by Lester S. Ivins. Lebanon, O. March Bros., 1920.

Dialogues for Rural Schools for all Ages, by Mary L. Monaghan, Chicago, T. S. Denison & Co., 1920

The Bookkeeper's Handbook, 2d ed. Scranton, Pa. International Textbook Co., 1920. 302 pp.

The National Institute of Agricultural Botany, 1st report, 1919-20. Cambridge, 1920.

Reciprocity with Canada; a Study of the Arrangement of 1911. Washington, Tariff Commission, 1920.

Agricultural Staples and the Tariff; production, trade and foreign competition with special reference to Canada. Washington, 1920. (Tariff information series, No. 20).

The Soil and its Care, by Mrs. M. Grieve, F.R.H.S., practical herb expert. Tamworth, Carrick print, 1920.

Johnson's New Handy Manual on Plumbing, Heating, Ventilating and Mechanical Refrigeration; 10th ed. Park Ridge, Ill. J. W. Johnson, 1920.

How to Keep Bees for Profit, by D. Everett Lyon, Ph.D. Toronto, Macmillan Co. of Canada, 1918.

The Microanalysis of Powdered Vegetable Drugs, by Albert Schneider, M.D., Ph.D. Professor of Pharmacology, University of Nebraska, 2d ed. Philadelphia, P. Blakiston's Son & Co., c1921.

Annuaire de l'Agriculture et des Associations Agricoles, par C. Silvestre, President du Syndicat Agricole du Bois-d'Oingt. Lyon, Publications Silvestre, 1920.

Rural Health, Proceedings of the Second National Country Life Conference, Chicago, 1919. Washington, D.C. American Country Life Association.

Principles of Health Control, by Francis M. Walters, A.M., Professor of Physiology and Hygiene, State Normal School, Warrensburg, Mo. Boston, D.C. Heath & Co., 1916.

Productive Agriculture, by John H. Gehrs, B.S., M.S., Toronto, Macmillan Co. of Canada, 1918.

Training the Boy, by William A. McKeever, Toronto, Macmillan Co. of Canada, 1919.

Foods and Household Management, b Helen Kinne, Professor of Household Arts Education and Anna M. Cooley, B.S. Asst. Professor Household Arts Education, Teachers College, Columbia University. Toronto, Macmillan Co. of Canada, 1920.

Manual of Home-Making, compiled by Martha Van Rensselaer, Flora Rose and Helen Canon, Dept. of Home Economics, Cornell University. Toronto, Macmillan Co. of Canada, 1919

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Household Bacteriology for Students in Domestic Science, by Estelle D. Buchanan, M.S., and Robert E. Buchanan. Toronto, Macmillan Co. of Canada, 1919.

A Study in Canadian Immigration, by W. G. Smith, B.A., Associate Professor of Psychology, Toronto University. Toronto, Ryerson Press, 1920.

Marketing—Its Problems and Methods, by C. S. Duncan, Ph.D., formerly Assistant Professor of Commercial Organization, University of Chicago. New York, D. Appleton & Co., 1921.

Marketing Problems, by Melvin Thomas Copeland, Ph. D. Professor of Marketing, Harvard University. Chicago, A. W. Shaw, Co., 1920.

Oxford Tracts on Economic Subjects, I-IV. London, Oxford University Press, 1920. 4 parts. 10½d. each.

Some Significant Aspects of the Agrarian Revolution in the United States, by Louis Bernard Schmidt. (Reprint from Iowa Journal of History and Policies, July, 1920).

Rural Wealth and Welfare, by G. T. Fairchild, LL.D., 3rd edition. Toronto, Macmillan Co. of Canada, 1913. (Rural Science Series).

Trade Associations—Their Organization and Management, by Emmett Hay Naylor, President, American Trade Association Executives. New York, The Ronald Press Co., 1921. Bibl. pp. 321-326.

Hints on Horsemanship, by M. F. McTaggart, D.S.O., London, William Heinemann, 1919.

Utility Ducks and Geese, by J. W. Hurst, formerly editor of the Poultry World. London, Constable & Co., Ltd., 1919.

Animal Castration, by George R. White, M.D., D.V.S., 2nd ed. Chicago, American Veterinary Publishing Co., 1920.

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Parasites and Parasitosis of the Domestic Animals, by B. M. Underhill, V.M.D., Professor of Parasitology, University of Pennsylvania. Toronto, Macmillan Co. of Canada, 1920.

Principles of Veterinary Science, by Frederick Brown Hadley, Professor of Veterinary Science in the University of Wisconsin. Philadelphia, W. B. Saunders Co. (Toronto, J. F. Hartz Co.) 1920.

The Bloodstock Breeders' Review, edited and published by the British Bloodstock Agency, Ltd. London, 1920.

The Feeding of Crops and Stock, by Sir A. D. Hall, M.A., F.R.S. London, John Murray, 1919.

John Burroughs—Boy and Man, by Clara Barrus, M.D., Garden City, N.Y., Doubleday, Page & Co., 1920.

Natural History Studies, by J. Arthur Thomson, M.A., LL.D., New York. Henry Holt & Co., 1921.

The Nature of Animal Light, by E. Newton Harvey, Ph.D., Professor of physiology, Princeton University. Philadelphia, J. B. Lippincott Co., c1920. 182 pp. (Monographs on experimental biology).

Botany of the Living Plant, by F. O. Bower, Regius Professor of Botany, University of Glasgow. Toronto, Macmillan Co. of Canada, 1919.

The Chemistry of Plant Life, by Roscoe W. Thatcher, M.A., D.Agr. Dean of the Dept. of Agriculture, University of Minnesota. New York, McGraw-Hill Book Co. Inc., 1921.

The Microscope, by Simon Henry Gage, Professor of Histology and Embryology, Cornell University; 13th ed. Ithaca, Comstock Publishing Co., 1920.

Heredity and Eugenics, by J. M. Coulter, C. B. Davenport, E. M. East, W. L. Tower. Chicago, University Press, 1917. 315 pp. illus.

Practical Amateur Gardening, by H. H. Thomas, Toronto, McClelland & Stewart 1920 (Cassell & Co.).

How to Know the Butterflies, by John Henry Comstock, Professor of Entomology in Cornell University and Anna Botsford Comstock, Lecturer in Nature Study in Cornell University. Ithaca, Comstock Publishing Co., 1920.

The Wonders of Natural History, by A. Frederick Collins and Virgil D. Collins. New York, F. A. Stokes Co., 1920.

La Protection des Oiseaux, par Henri Kehrig, Paris, Hachette, 1921.

The Story of Newfoundland, by the Right Honourable the Lord Birkenhead, Lord High Chancellor of Great Britain. London, Horace Marshall & Son, 1920.

A Handbook of Forestry . . . by A. D. Webster. London, William Rider & Son, Ltd., 1920.

Peat Industry Reference Book, by Fred T. Gissing. London, Charles Griffin & Co., Ltd., 1920.

Cocoa and Chocolate; their History from Plantation to Consumer, by Arthur W. Knapp, B.Sc., F.I.C., Research Chemist to Messrs. Cadbury, Ltd. London, Chapman & Hall, Ltd., 1920.

Management of Dairy Plants, by M. Mortensen, Professor of Dairying, Iowa State College. Toronto, Macmillan Co. of Canada, 1921.

The Public Milk Supply, by Hugh A. Macewen, M.B., D.P.H., Assistant Medical Officer of Health for Cumberland. London, Blackie & Son, Ltd., 1910.

Dairy Technology . . . by C. Larsen, M.S.A., Professor of Dairy Husbandry, and William White, B.S.A., formerly Instructor of Dairy Husbandry, South Dakota State College. New York, John Wiley & Sons, Inc., 1914.

Dairy Chemistry . . . by Henry Droop Richmond, F.I.C., Chief Analyst to Boots Pure Drug Co., Ltd., 3d ed. London, Charles Griffin & Co., Ltd., 1920.

The Laboratory Book of Dairy Analysis, by Henry Droop Richmond, F.I.C. 2d ed. London, Charles Griffin & Co., Ltd., 1912.

Manures and Fertilizers, by Homer J. Wheeler, Ph.D., D.Sc., Chemical expert of the American Agricultural Chemical Co. Toronto, Macmillan Co. of Canada, 1920.

Fertilizers and Manures, by Sir A. D. Hall. London, John Murray, 1920.

Soils and Manures, by J. Alan Murray, B.Sc., London, Constable & Co., Ltd., 1919. 354pp. illus.

Pathological Technique . . . by Frank Burr Mallory, A.M., M.D., Pathologist to the Boston City Hospital, and James Homer Wright, A.M., M.D., S.D., Pathologist to the Massachusetts General Hospital. 7th edition. Philadelphia, W. B. Saunders Co., 1921.

Home-Farm Power and Lighting, by the editorial staff of the American Automobile Digest. Cincinnati, American Automobile Digest, 1920.

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Dams and Weirs, by W. G. Bligh, formerly engineer, Public Works Dept., India, and Dept. of Interior, Canada, and member of Canadian Society of Civil Engineers. Chicago, American Technical Society, 1917.

Concrete Work . . . by William Kendrick Hatt, C.E., Ph.D., Professor of Civil Engineering, Purdue University, and Walter C. Voss, B.S., Head, Dept. of Architectural Construction, Wentworth Institute, Boston, Mass. New York, John Wiley & Sons Inc., 1921.

Power Development of Small Streams, by Carl C. Harris, Member of Amer. Society of Mechanical Engineers, and Samuel O. Rice, Assistant Professor of Journalism, University of Kansas, Kansas City, Mo. Orange, Mass., Rodney Hunt Machine Co., 1920.

The Calculation of Horse Power Made Easy, by L. Elliott Brookes. Chicago, Frederick J. Drake Co., 1905.

Concrete Houses; How they were Built, ed. by Harvey Whipple. Detroit, Concrete-Cement Age Publishing Co., 1920.

Questions and Answers relating to Modern Automobile Design Construction, Driving and Repair . . . by Victor W. Page, M.E. New York, N. W. Henley Publishing Co., 1920.

New Publications from the Carnegie Institution of Washington:

The North American Species of *Drosophila*, by A. H. Sturtevant. Publication No. 301. 1921.

Root development in the grassland formation; a correlation of the root systems of native vegetation and crop plants, by John E. Weaver, Professor of Plant Ecology, University of Nebraska. Publication No. 292. 1920.

Contributions to embryology, vol. XI. Nos. 49-55. Publication No. 274. 1920.

Metabolism and growth from birth to puberty, by F. G. Benedict and F. B. Talbot. Publication No. 302. 1921.

The Echinoderm fauna of Torres Strait; its composition and its origin, by H. L. Clark. Publication No. 214. 1921.

Grammar and vocabulary of the Lau language, Solomon Islands, by Walter G. Ivens, M.A. Publication No. 300. 1921.

Carnegie Institution of Washington, Year Book, No. 19. 1920.

New Publications from the Carnegie Endowment for International Peace:

Autonomy and Federation within Empire—The British Self-governing Dominions, prepared under the supervision of James Brown Scott. Washington, D.C., 1921.

Official Statements of War Aims and Peace Proposals, Dec. 1916 to Nov. 1918. Washington, D.C., 1921.

The United States of America—A Study in International Organization, by James Brown Scott, A.M., J.U.D., LL.D. Washington, D.C., 1920.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

Annual Report of the Dominion Experimental Farms, 1919-20.—Department of Agriculture, Ottawa.—The report gives a summary of the work performed during the year under review by the farms and stations included in the Experimental Farms System of the Dominion, including the activities of the Central Farm at Ottawa.

ONTARIO

Report of the Horticultural Experiment Station, Vineland, 1919.—Ontario Department of Agriculture, Toronto. This report, which is largely of a technical nature, contains particulars of the work of the year under

review in connection with plant breeding, experimental pomology, vegetable experiments, and by-products investigations including variety tests for canning and jam-making.

Sunflowers as a Farm Crop.—Circular No. 35, Ontario Agricultural College. Issued by the Department of Agriculture, Toronto.

Sweet Clover as a Farm Crop.—Bulletin No. 283, Ontario Agricultural College. Issued by the Department of Agriculture, Toronto.

Sweet Clover as a Farm Crop.—Bulletin 283, Department of Agriculture, Toronto, by C. A. Zavitz, B.S.A., D.Sc. The object of the Bulletin is to give information regarding the results of experiments conducted at the Ontario Agricultural College and to present data regarding its value as a crop.

THE AGRICULTURAL GAZETTE OF CANADA

Ginseng.—Circular No. 34, Ontario Department of Agriculture.

The Cost of Producing Tomatoes on Niagara District Fruit Farms.—Circular No. 33, Ontario Department of Agriculture.

Appendix to Annual Report of the Agricultural Societies, 1920.—Ontario Department of Agriculture, Toronto. Containing in tabular form the results of competitions in Standing Field Crops and Prize Winning Grain at Winter Fairs and at the Canadian National and Central Canada Exhibitions.

Farm Management, 1920, Part 8.—"Mixed Farming and Apple Growing in Ontario."—Bulletin 282 of the Ontario Department of Agriculture. This bulletin contains the results of a first survey of 242 farms in Durham County, Ontario, made by the department of Farm Economics of the Ontario Agricultural College. The type of farm covered is the general purpose farm where apple production is an important feature.

MANITOBA

Poisoning Grasshoppers.—Circular No. 59. This four page leaflet, issued by the Manitoba Department of Agriculture, gives particulars as to the Manitoba grasshopper poison mixer; ingredients used in baits, and how materials are mixed and scattered.

SASKATCHEWAN

Report on the Royal Commission into Farming Conditions.—This report contains the findings of the commission appointed to study conditions in the semi-arid portions of southwestern and western Saskatchewan, and to investigate methods and crops.

With a view to improving conditions and making farming more profitable, after reviewing conditions, the commission recommends the making of a soil survey, the establishment of sub-stations of the College of Agriculture and the carrying on of co-operative experiments to test varieties of crops; a practical system of farm management; a change in methods of cultivation and more diversified farming to prevent soil blowing; co-operative experiments with farmers; the appointment of a staff of agricultural representatives trained in the science and practice of practical agriculture, one for every four municipalities, provided that at least three of the four request the services of such a representative.

The report is an exceedingly important one to farmers in the southwest portion of Saskatchewan, and of interest to all Western

Canada farmers. Copies may be secured free of charge by writing to the Department of Agriculture, Regina.

The Pit Silo.—Field Husbandry Circular No. 32, University of Saskatchewan.

BRITISH COLUMBIA

Silos and Root Cellars for Prairie Farms.—Bulletin No. 9. Farm Building Series, Department of Lands, Victoria, B.C.

The plans and bills of material presented in this bulletin, were prepared by the College of Agriculture, University of Saskatchewan, with a view to meeting prairie conditions. The information concerning lumber is supplied by the British Columbia Forest Service.

The Potato in British Columbia, Bulletin No. 86 of the Department of Agriculture. A complete treatise on the culture of the potato under British Columbia conditions including storing, grading, shipping, and marketing. Insect pests and potato diseases are also dealt with. The bulletin is very completely illustrated.

Directory of Poultry Breeders in British Columbia, Bulletin No. 10 of the B.C. Poultry Association. A list of breeders of Pet Stock is also included.

MISCELLANEOUS

Conservation of Soil Fertility and Soil Fibre.—Report of conference held at Winnipeg, 1920, to consider best methods of increasing and preserving the productivity of farm lands through intelligent management.—Commission of Conservation, Ottawa

The report deals with Western crop production; choice of crops, and soil productiveness; cropping systems for drought areas; advantages of systematic crop rotations; good seed; soil moisture; fundamental principles of soil fertility; soil drifting; windbreaks; the weed menace, and the need of further irrigation development in Southern Alberta.

Canadian National Records for Sheep. Volume 9, 1920.—Compiled by the Office of the Canadian National Live Stock Records, Ottawa. Containing pedigrees recorded during the year of all the breeds constituting the Association, together with index of animals and of breeders and owners.

The Canadian Mother's Book.—A handbook for the guidance of mothers, issued by the Child Welfare Division of the Dominion Department of Health, Ottawa. Copies either in English or French may be had on application to the Department.

THE AGRICULTURAL PRESS

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- British Columbia United Farmer, Victoria,**
February 15. *Ensilage—Which Kind Shall We Use?* W. Hicks, Superintendent, Agassiz Experimental Farm.
- The Canadian Countryman, Toronto, Ont.**
February 26. *Feeding Our Foster Mothers for Production.* A. R. Ness, Department of Animal Husbandry, Macdonald College.
- March 5. A Central Sales Agency for Ontario Apples.** C. W. Baxter, Dominion Fruit Commissioner.
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February, 1921. *Retirement of Dr. Walker as Editor.* A. Gibson, Dominion Entomologist, Ottawa.
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The Larva and Breeding Place of Aedes aldrichi. E. Hearle.
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January, 1921. *Additional Records of Dragonflies from the Ottawa Region.* J. H. McDunnough.
Dragonflies of the Lake of Bays Region. J. H. McDunnough.
- The Canadian Poultry Review, Toronto, Ont.**
March *The Poultry Outlook.* W. A. Brown, Chief, Poultry Division, Ottawa.
- Canadian Power Farmer.**
February. *The University and the Farm.* John A. M. Edwards, M.A., University of Manitoba.
- Farmer's Advocate, Winnipeg, Man.**
March 9. *Questions Farmers Ask Me About Silos.* W. C. McKillican, Superintendent, Experimental Farm, Brandon, Man.
- When is a Milk Cow a Losing Proposition.* A. A. Dowell, Professor of Animal Husbandry, University of Alberta.
- Farm and Dairy, Toronto, Ont.**
April 7. *Economic Feeding of Dairy Cattle.* E. S. Archibald, Director of Central Experimental Farm, Ottawa.
- Farm and Home, Vancouver, B.C.**
March 10. *British Columbia Produces 25% of Its Pork.* Professor H. M. King, University of British Columbia, Vancouver, B.C.
- Farmer's Magazine, Toronto, Ont.**
February 24. *The Breeding of Livestock.* Professor G. E. Day, Secretary, Dominion Shorthorn Breeders' Association.
An Experiment in Steer Feeding. Professor Wade Toole, Ontario Agricultural College, Guelph, Ont.
March 10. *Shorthorn Bulls I Have Met.* Hon. Duncan Marshall, Minister of Agriculture of Alberta.
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March 8. *The Markets and Marketing of Live Stock.* A. B. McDonald, Dominion Live Stock Representative, Truro, N.S.
Spraying and Dusting. G. E. Sanders, Entomologist, Annapolis Royal, N.S.
March 22. *The Orchardist's Problems.* B. M. Davis, Assistant Horticulturist, Ottawa.
- Proceedings of the Entomological Society of British Columbia, Victoria, B.C.**
January, 1921. *Tree Hoppers of British Columbia.* W. Downes.
- Scientific Agriculture, Gardenvale, Que.**
January, 1921. *The Grasshopper Outbreak in the Prairie Provinces.* A. Gibson, Dominion Entomologist, Department of Agriculture, Ottawa.
Dusts and Dusting for Insect and Fungus Control. G. E. Sanders and A. Kelsall.
February, 1921. *Mosquito Control Investigations in British Columbia.* E. Hearle.

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty, International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

CROPS AND CULTIVATION

Smudging as a Protection from Frost.—KIMBALL H. H., and Young, F. D. in *United States Monthly Weather Review*, Vol. 48, No. 8, pp. 461-462, Washington, D.C., August, 1920.

Summarizing the results of measurements of radiation in tests of orchard heaters at Washington, D.C., Pomona, Calif., and Medford, Oregon, the authors conclude that "the presence of a dense smoke cloud diminishes nocturnal radiation on an average about 0.011 calorie per minute per square centimetre of surface, with maximum effects of nearly 0.03 calorie. At a distance of 10 ft. the intensity of radiation from a lard-pail heater is about 0.08 calorie per minute per square centimetre; from a short-stack heater, about 0.1 calorie; from a high-stack heater when just turning red, 0.12 calorie, and when completely red, from 0.25 to 0.3 calorie.

Since the intensity of radiation varies inversely as the square of the distance from the source of heat, at a distance of 15 ft. from the heaters it will be less than half, and at 20 ft. about one-fourth that given above. The heating by radiation is in addition to the heating by conduction and convection of hot air and gases from the burning oil and its immediate vicinity.

It must therefore be concluded that the retardation of nocturnal radiation by the smoke cloud plays an insignificant part in frost protection.

1087.—Can the Probable Fertility of a Soil be Predicted from Biological Data? BURGESS, P.S., in *Soil Science*, Vol. VI, No. 6, pp. 449-462. Bibliography of 24 publications. Baltimore, 1918.

Experiments carried out with 9 Hawaiian soils with a view to the correlation of their

fertility, or rather, their crop-producing powers from the following microbiological data: ammonification, nitrification, and organic nitrogen fixation. These data were checked by comparative tests.

Ammonification tests are not suitable by differentiating between the fertilities of average soil, although they will often show differences between very poor and very good soils. In the same way, the crop-producing power of a soil in no wise depends upon its capacity of dissolving organic nitrogen.

On the other hand, nitrification (soil culture method) is by far the most accurate biological test for estimating soils fertility. It must not be forgotten, however, that though nitrification tests may be a means of differentiating between good and poor soils, they do not show the causes of the differences noted, nor the way in which the condition of the infertile soil can be improved. Only chemical, physical and physiological experiments can give us this information.

A remarkable correlation was found between the amounts of nitrogen fixed in mannite solution cultures and the known fertilities of the soils studied. These data afford a means of estimating the fertility of a soil from the standpoint of its power of nitrification; naturally, the fixation of the nitrogen depends largely upon the presence of species of *Azotobacter*.

15.—Toxicity of Alkaline Salts in the Soil.—SIRGH, T. M., in *Soil Science*, Vol. VI, No. 6, pp. 463-477. Bibliography of 19 works. Baltimore, 1918.

The detrimental effect of the accumulation of alkaline salts in the soil has formed the subject of study and is well known, but up to the present time experimental investigations have only been made on isolated salts or on arbitrary mixtures of those salts.

The author has endeavoured only to study the phenomenon under Oregon conditions and he divided his work into 3 parts:—

(a) Determination of the toxic points of chloride, nitrate, carbonate and sulphate of sodium on peas and wheat.

(b) Determination of the toxic point for peas and wheat by using a mixture of salts similar to those found on analyzing field soil.

(c) Determination of the effect of chloride, nitrate, carbonate and sulphate of sodium upon ammonification, nitrification, and nitrogen fixation.

The observations were made on a heavy loam soil, highly productive under normal conditions and under suitable cultivation, but on which, under dry farming, alkaline spots gradually appear, whilst under irrigation, perhaps excessive, the alkali soon appears.

The salts experimented with are classified as follows in decreasing order of toxicity:—Chloride, nitrate, carbonate and sulphate of sodium both as regards the germination and the growth of wheat and peas and relatively to the ammonifying, nitrifying and nitrogen-fixing bacteria, the determining factor of this toxic action being found in the percentage of the anion and not of the cation. Small quantities of the different salts used had a stimulating effect both on the growth of the plant and on bacterial activity; the degree in which this stimulating effect was noticed varied with the plant grown.

The toxicity point, that is to say the degree of concentration at which the detrimental effect is produced, for mixtures of salts in conditions similar to those in fields, agreed closely with that noted for each individual salt; the toxicity point of the mixture of salts depends, therefore, on the percentage of chloride, nitrate, carbonate and sulphate present and how they are combined; however, sulphate of calcium tends to lower the toxicity of the chloride, carbonate and nitrate of sodium.

Carbonic Acid Gas to Fertilize the Air.—GRADENWITZ, A., in *Scientific American*, Vol. 123, No. 22, p. 549. New York, 1920.

A brief account is given of work by F. Riedel, at Essen-on-Ruhr, in using the purified gasses from blast furnaces in greenhouses and plat experiments with various crops, including castor bean, tomatoes, cucumbers, spinach, potatoes, barley, and lupines. The air of the greenhouses was charged with the gasses through perforated pipes. The air surrounding the plants grown in the open was supplied with the gasses in a similar way. The purified gasses contained 20 per cent of carbon

dioxid. There was a marked increase of production, both in greenhouses and in the open, by the application of the gasses and no injurious effects.

Danish Experiments with Different Nitrogenous Fertilizers.—JACOBSEN, in *Deut. Landw. Presse*, Vol. 47, Nos. 13, 16, and 17. Berlin, 1920.

Comparative tests of Chilean, Norwegian, and ammonium nitrates, ammonium sulphate, and lime nitrogen from German, Swedish, and Norwegian sources are reported, using barley, oats, orchard grass, beets, and potatoes as crops. In addition, mixtures of Chilean nitrate with ammonium sulphate and with lime nitrogen were also tested. In the four years 276 tests were conducted.

It was found that Chilean and Norwegian nitrates gave the best results, especially with barley and oats, the results being equal. Ammonium nitrate was second in effectiveness, followed closely in their order by the ammonium sulphate and lime nitrogen.

The effectiveness of the different fertilizers varied with the kind of soil and its reaction. The residual effect of all the fertilizers was generally small. The fertilizers exerted a slightly depressing influence on the dry matter content of beets, which was less for lime nitrogen than for Chilean nitrate. The dry matter content of potatoes was more depressed by lime nitrogen than by Chilean nitrate, however. Ammonium nitrate gave better results when broadcast in early spring before planting than at the time of planting. The opposite was true with Chilean nitrate. The mixtures of Chilean nitrate with ammonium sulphate and with lime nitrogen gave results equal to the average of those given by the individual fertilizers in each mixture.

Electroculture. RAE, F. J., in *Journal of the Department of Agriculture for Victoria*, Vol. 18, No. 7, pp. 385-394. Melbourne, 1920.

This is a general review of the subject, the author discussing in brief the different modes of application, including illumination by electric light, conduction of atmospheric electricity from elevated conductors to the soil, burying plates of copper and zinc in the soil and using the soil as an electrolyte, passing a current through the soil from external sources, silent discharge from antennae or overhead network, and electrochemical treatment of seeds.

Wheat Investigations.—ZINN, J., in *Maine Agr. Exp. Station*, Bulletin 285, p. 48. Orono, Maine, 1920.

An account of the origin and development of a number of pure lines of wheat by the method of selection is presented. The

relation of environment to the chemical composition and quality of wheat is discussed, and the soils, climate, and characteristics of the wheats of Aroostook County are described. The author also makes observations on the adaptation of pure strains from Minnesota to the environment of northern Maine.

Several hundred wheat spikes representing the four chief groups of hard spring wheat grown in Aroostook County were planted in 1915, and by 1917 selection had reduced this number to 44 pure lines and to 6 lines of the 7 Minnesota strains introduced in 1916. A complete chemical analysis of 37 lines and baking tests of 31 wheat lines made in the spring of 1919 led the breeder to reject all but 12 Aroostook lines and 4 Minnesota lines for the 1919 crop.

Observations on the different tests may be summarized as follows: Under the same environmental conditions pure lines of wheat showed distinct differences in physical and chemical characteristics and in the bread value of their grain. The average weight of 1,000 kernels of all lines was found to be 35.314 gm., with the weights for individual strains within a variety ranging from 26.541 to 44.789 gm. and deviating in marked degree from the average of their respective parent varieties. It appeared that strains with the highest weight per 1,000 kernels produced the greatest percentage of yellow berries and yielded flour of poor baking quality. Environmental conditions in Aroostook County are believed to have elevated the originally low kernel weight of the Minnesota seed to the level of that of Aroostook strains in a single season.

Limited yield data indicated that each variety furnished high and low yielding strains, with greater differences in yield between the lines of the same variety than between varieties themselves.

A comparison of the protein content of the pure lines in 1917 and 1918 revealed a tendency for varieties, as well as strains, to retain their relative rank with respect to this quality from year to year. The coefficient of correlation between the protein content of the pure strains in the years noted was found to be 0.381. The Aroostook-grown Minnesota bread wheats tended to retain their high protein content in this respect, averaging higher than the Aroostook pure lines. Among the durum strains deterioration was very rapid. Speltz Marz and Hedge Row were the highest of the Minnesota productions in protein content; after one season's growth in Aroostook, these lines showed the lowest protein percentage of all 99 strains analyzed. The low protein content is said to have been accompanied by a very high percentage of yellow berries.

Preston strains contained the highest percentage of gluten, followed by the Minnesota, Red Fife, Canada Red, Bluestem, and Marquis lines in the order named. With respect to the quality of gluten, Red Fife and Bluestem strains were found to be superior to strains of Preston and Marquis. The Minnesota strains, with the exception of durum and Marquis wheat, yielded a strong elastic gluten of good quality.

Baking tests brought out very marked variations in the flour strength of the different pure lines, the volume of bread loaf baked from 340 gm. of flour ranging from 1,518 to 2,221 cc. The bread baked from the flour of a number of strains possessed excellent baking and eating quality. Data from the baking and other tests indicate to the author that strains of wheat of good quality can be isolated and successfully grown under Aroostook conditions.

Seed Identification.—FRUWIRTH, C., in *Die Saatenanerkennung*. Berlin: Paul Parey 1918.

This work relates the progress of seed improvement and identification work, outlines methods of inspection of seed crops in the field and in storage, and discusses the relation of seed inspection to the production of pure seed. The author treats in detail the recognition of species and varietal mixtures, weeds, and plant diseases depreciating the value of the seed of specific cereals, legumes, grasses, root crops, and vegetables.

Factors that Affect Alfalfa Seed Yields.—BLINN, P. K., in *Colorado Agricultural Experiment Station Bulletin* 257, pp. 32. Fort Collins, Col., 1920.

Continuing work previously noted, this reports the progress of experiments to determine the controlling factors in alfalfa-seed production. The investigations embraced studies of the seed setting tendencies of the different varieties and the effect of seed selection on improvement of seed yields; moisture requirement, irrigation, cultural, and spacing tests; and observations on the relations of insects, climatic conditions, and soil fertility to alfalfa-seed production. Much of the work was carried on in co-operation with the Office of Forage-Crop Investigations of the U.S. Department of Agriculture. The conclusions, which are deemed somewhat indefinite, may be summarized as follows:

A difference in the inherent seed-setting tendency of different strains of alfalfa was noticeable, the southern strains, particularly from Ecuador, Peru, and Tripoli appearing to be strongest in this respect. These are not considered adapted to the climatic conditions, lacking hardness. Although seed selection for prolific seed yield improved the

ability of the selected stocks to produce seed yields, the improvement is not thought sufficient to solve the problem.

The amount of moisture for alfalfa-seed production should be so regulated that a minimum amount of forage growth will result and still have water enough to fill and mature the seed. Pasturing off the first growth late in the spring has apparently stimulated good seed yields. Good seed yields seem to be coupled with an arrangement of the irrigation system such as to regulate the amount of water and hold it close to a minimum requirement. Apparently this is best done by having small irrigation furrows about every 30 in. and thus irrigating by the furrow method.

A thin, uniform stand, about 1 plant to 1 or 2 sq. ft. is thought necessary for the best seed-production results. Growing alfalfa in rows is held objectionable, principally on account of the difficulty in handling the crop with machinery.

But very little evidence that bees are essential to alfalfa-seed yields was discovered. Dry climatic conditions with high temperatures seem to be among the most essential requirements for successful alfalfa-seed production. While the effect of fertilizer or nutritive substances on alfalfa-seed production has not been investigated, the author states that indications point to soil nitrates in excessive quantities as a serious cause of poor seed yields in many irrigated regions.

Alfalfa.—United States Department of Agriculture, Circular 126, pp. 7. Washington, D.C., 1920.

Brief popular instructions on cultural methods considered best for growing the crop in the New England States and New York are presented, together with descriptions of several commercial varieties suited to the region.

Drug Plants Under Cultivation.—STOCKBERGER, W. W., in *U.S. Dept. of Agr. Farmers' Bulletin* 663, pp. 50. Washington, D.C., 1920.

This Bulletin gives general suggestions relative to the culture, harvesting, distillation, yield, marketing, and commercial prospects for drug plants. Specific information is also given concerning the cultivation, handling, and yield of individual species and the demand and prices paid for the product.

The market demand for many cultivated plant drugs is not large enough to justify growing them except as small minor crops. The haphazard production of crude drugs in small lots of a few pounds usually means a dissatisfied producer.

A special knowledge of trade requirements is necessary in collecting, curing, preserving, and packing drugs for market. Most farm products find a ready local market; a special market must be sought for plant drugs. High prices for plant drugs do not insure large profits in producing them. Not the price received, but the difference between the cost of production and the selling price is the important point.

LIVE STOCK AND BREEDING

1179.—**The Requirements for Growth in Cattle.**—GOUIN, A., and ANDOUARD, P., in *Comptes Rendus de l'Academie d'Agriculture de France*, Vol. V, No. 22, pp. 633-638. Paris, June 18, 1919.

Animals when they have made some growth consume only $\frac{1}{3}$ of the rations fixed by German rules so as to make a certain rate of progress. At an earlier stage the error is smaller, but still appreciable. Wolff and Kellner fixed the quantities of dry matter ingested per day at 2600 gm. per 100 kg. of live weight, for young animals which make indifferent growth. Now, in the course of their experiments, the authors found only once, during a period of 10 days only, a subject capable of ingesting 2607 gm. of dry matter per 100 kg. of its weight on special rations. On the whole, animals of over 150 kg. which made a daily gain of 853 gm. consumed 2067 gm. of dry matter per day. The rules exceed the reality by 25%, and lead to theoretical gains much below those obtaining in practice.

All foods do not behave in the same way during digestion. Some, of which the volume is considerable compared with their low feeding value, such as skim milk and roots, do not stay in the stomach long, because the organism soon gets rid of the water with which they are saturated.

Cakes and other concentrates take up little space in the digestive tract. The excreta they produce do not weigh more than the feeding principles they yield to the organism.

The opposite is the case with ligneous fodders. Hay remains a long time in the stomach. It attracts there an enormous quantity of water, the importance of which it appears impossible to appreciate, because a large part of such water is dispersed when the material being digested passes into the intestine. The weight of excreta produced by a very ordinary quality of hay is 6 times greater than the fraction of this feed utilized in digestion.

Only when we can add to the knowledge of food composition a knowledge of the way in which foods behave in the course of digestion, will it be possible to make up a

food in which the proportion of bulky fodders will exactly meet the requirements for intensive rearing. If this proportion be too high, it will impede growth; if it is kept lower than necessary, there will be waste of concentrated foods and a serious loss to the breeder.

1188.—Some Factors Influencing the Rate of Growth and the Size of Dairy Heifers at Maturity.—ECKLES, C. H., and SWETT, W. W., in *Missouri Station Research Bulletin* No. 31, pp. 3-56. Columbia, Missouri, 1918.

To serve as standards of growth for Holsteins and Jerseys, data are published of the body weight and height at withers by months of a group of heifers of each breed that were kept under normal conditions, that is, fed on skim-milk from 2 weeks to 6 months of age, with alfalfa, silage and a small amount of grain in winter, and a good blue grass pasture in summer. The plan was to keep the animals in a good thrifty condition but not fat. The use of height at withers to measure skeletal growth is justified by computations showing that the percentage increments in height at hips, heart girth, and distance from shoulder-point to pin-bone in successive ages maintain an approximately uniform ratio to the corresponding increments in height at withers. As was expected, the ratios for hip width increased with age.

The weights at birth and the mature heights of 30 Holstein and 32 Jersey heifers are tabulated individually, the heights at intermediate ages being also given for some of the animals. Little or no influence of birth weight on adult height was discovered.

Note is made of a Jersey heifer which at the age of 6 months was put on a diet as low in calcium and phosphorous as could be secured from feeding stuffs likely to be used in practice. The growth in weight and height was normal for 13 months thereafter, when a physical breakdown ensued.

The rest of the bulletin—the major part—is devoted to the presentation of the complete results of a study, previously reported, of the influence of quantity of feed on the changes in weight and height of dairy heifers from birth to maturity and the effect of early calving on their subsequent body development. Evidence is produced showing that the check in growth of young animals after parturition is a result of the physiological drain, not of pregnancy, but of lactation.

87.—Relationship Between the Quality of Proteins in Foods and Milk Production of Cows.—HART, E. B. and HUMPHREY, G. C., in *The Journal of Biological Chemistry*, Vol. XXXV, No. 2, pp. 367-383. Baltimore, August, 1918.

Two Guernsey cows and one Jersey were used in the experiments described in this

paper. The daily production of milk of the 3 cows indicated by Nos. 1, 2 and 3 was 22.00, 28.00, 24.20 pounds respectively. The ration was made up of 14% of alfalfa hay, 56% of maize stalk silage, 12% of maize meal, and 18% of a mixture of starch and supplementary food. The nutritive ratio of the ration was 1:8.4. Total protein represented 10% of the dry matter; 50 lb. of the ration furnished 2.32 lb. of digestible protein, of which about 37% came from the supplementary foods; the production energy varied from 20.59 to 20.76 big calories. The nitrogen balance during the whole period of the test which lasted 16 weeks, was always negative no matter what the supplement was. During the test the cows maintained their live weight, but there was a slight decrease in milk production. The percentage composition of the milk remained almost constant.

The efficiency of the various rations is shown in the following table:—

Absorbed nitrogen used for milk production by cows fed on alfalfa hay with various concentrates.

Concentrate	Cow No. 1	Cow No. 2	Cow No. 3
	%	%	%
Gluten feed (gluten and maize bran ground together).....	40	43	43
Linseed meal.....	40	47	39
Brewers' grain.....	51	53	50
Cottonseed meal.....	35	42	28

Earlier studies by the authors showed that gluten feed is distinctly inferior for milk production, to linseed meal and to distillers' grain as supplements for proteins to the ration "corn stover" + maize meal; that, on the contrary, as supplement to the ration clover hay + maize meal, gluten feed is practically equivalent either to linseed meal or distillers' grain; the experiments now dealt with show that as supplement to the ration alfalfa hay + maize meal, gluten feed is equal to linseed meal, superior to cottonseed meal and inferior to distillers' grain. Cottonseed meal with the ration alfalfa hay + maize meal was the least efficient of the supplements.

Distillers' grain was the most efficient of the supplements, perhaps because it contains the embryo proteins. An equally efficient protein mixture might be obtained by adding 10 to 15% of maize germ meal to gluten feed.

These results once again show the limited value of any classification of natural foods in respect of the efficiency of their proteins based on the determination of that nutritive value in a single food or in a single mixture of foods.

94.—**Sheep Feeding in the United States.**—SKINNER, J. H., and STARR, C. G., in *Purdue University Agricultural Experiment Station Bulletin* No. 221, 20 pp. La Fayette, Ind., 1918.

95.—**Feeding of Lambs: Trials in Kansas, U.S.A.**—*Kansas Agricultural Experiment Station Report for the Year 1918*, pp. 43-53. Manhattan, 1919.

1191.—**The Influence of Barley on the Milk Secretion of Cows.**—WOLL, F. W., and VOORHIES, E. C., in the *Agricultural Experiment Station, Berkeley, California, Bulletin* No. 305, pp. 352-434. Berkeley, Cal., 1919.

The authors have furnished complete details of amounts and kind of feeds consumed, the body weights, and the quantity of milk and butter fat produced by:—(1) a grade Holstein cow during three lactations in which the only grain fed was barley, and during two in which mixed grains were fed; (2) a pure-bred Jersey, during four lactations, in one of which barley was the sole grain fed; (3) another pure-bred Jersey during two lactations in one of which a mixed grain was given, while barley was fed in the other. The authors also compare the production records of 15 other cows, most of them used previously in similar studies, during short periods (generally 5 weeks) of barley feeding, with their production records during the intervening period when they received mixed grain feeding.

An increased milk flow generally accompanied barley feeding, but the authors do not attribute this to the barley itself, but to the accident that when the cows only received barley feeding, they often consumed a larger quantity in comparison with mixed feeding. The authors do not call their trial tests, critical experiments, but the tests show that barley feeding has no deleterious effect on milk secretion, as is contended by some breeders of milch cows.

Mineral Feeds for Farm Animals.—FORBES, E. B., in *Ohio Agricultural Experiment Station, Monthly Bulletin*, Vol. 5, No. 7, pp. 205-215. Wooster, Ohio, 1920.

The author summarizes some of his published work on the mineral metabolism of cows and pigs, reviews the needs of horses, sheep, and poultry for mineral supplements, reports tests of the palatability of mineral feeds, and describes the various commercial preparations of calcium and phosphorus available for the animal feeder. It is noted that precipitated calcium carbonate is in many ways the most satisfactory calcium preparation, and that this is at present an almost useless by-product of soap manufacture. Steamed bone is considered the most useful source of phosphorus.

Holstein cows on dry feed were offered various mineral supplements. From the amounts consumed it is concluded that they found special steamed bone flour the most palatable and precipitated calcium carbonate the next. Other materials tested were precipitated bone, rock phosphate, marl, and pulverized limestone. The addition of common salt to the bone flour increased the palatability and the addition of acid decreased it.

With pigs the mineral supplements in the order of their decreasing palatability were as follows: Special steamed bone, precipitated bone, pulverized limestone, whiting, precipitated calcium carbonate, rock phosphate, and marl.

1193.—**Mineral Requirements of Sheep.**—FRAPS, C. S., in *Texas Agricultural Experiment Station, Bulletin* 232, pp. 5-20. Austin, Texas, 1918.

For each component of the ash of rations fed to sheep in 48 digestion experiments this bulletin furnishes data as to the amount fed per day, the amount not recovered in the faeces, and for 10 of the experiments the amount found in the urine.

Eighteen of the digestion trials were made in triplicate and 29 in duplicate, while 1 ration was fed to a single animal only. The digestibility of the organic nutrients and total ash of the rations of 43 of the experiments have been given in three previous bulletins (*Texas Sta. Bull.* No. 147, pp. 5-28; No. 166, 1914, and No. 203, 1916), while the details of 5 are unpublished. In most of the experiments the ration consisted of a single roughage; in the others, of alfalfa plus a supplement. The roughages fed were accuff sorgo fodder, alfalfa hay, Bermuda hay, bur clover hay, buffalo grass hay, maize fodder, cowpea hay, Guam grass hay, Johnson grass hay, Kafir corn fodder, millet, oat hay, peanut hay, para grass hay, prairie hay, Rhodes grass hay, rice hay, rice straw, sorghum and cowpea silage, sorghum hay, Jabosa grass, hay, and vetch hay. The supplements to alfalfa were maize bran, cold-pressed cottonseed cake, cottonseed meal, a mixture of cottonseed meal and hulls, Kafir corn chop, Kafir corn head chop, groundnut hulls, rice bran, rice hulls and rice polish. A table gives the percentages of silica (insoluble ash), lime, magnesia, phosphoric acid, and potash found in the samples used of all these feeding stuffs except Guam grass hay.

The author points out that the rectum is a recognized path of excretion from the body of some mineral elements, but finds it convenient to speak of difference between the intake and the faecal content as the amount digested, and also to call the percentage of the intake that is "digested" the coefficient

of digestibility. A table shows the digestibility of several constituents of the ash for each of the rations, except Guam grass, or 44 in all. In 14 of the silica entries, 10 of the lime and 12 of the phosphoric acid the digestibility was zero, that is the amount in the faeces exceeded the amount fed. There were no cases of "negative digestion" of magnesia and potash. The averages of such of the 44 determinations of the coefficient of digestibility as were not zero are given by the author as: silica 22.2, lime 32.3, magnesia 32.3, phosphoric acid 22.5, and potash 83.2. Grouping the determinations by the amount ingested shows, in the case of lime and phosphoric acid at least, that the coefficient of digestibility increases with an increase in the amount consumed, negative digestion figures occurring only as a rule when this amount was small. This condition indicates that fairly constant amounts of each are eliminated daily in the solid excrement. For lime the daily elimination is held to be about 0.6 gm. and the corrected digestibility to be about 25%. For phosphoric acid the elimination is 0.8 gm. and the approximate true digestibility is 50%. The data also indicate that an increased digestion of 1 gm. of lime is accompanied by an increased retention of 0.74 gm. of phosphoric acid.

Analyses of the urine collected in the balance experiments show that the mineral constituents appear in the urine in fairly constant amounts which are little if at all influenced by the amounts eaten or the amounts digested. It appears that 1.7 gm. of phosphoric acid, 2.8 gm. of lime, and 1 gm. of magnesia are required per day by sheep weighing about 100 lb. in order to maintain a mineral balance. About 0.2 gm. of potash and 0.54 gm. of magnesia per day were stored by these sheep.

In 18 experiments data are furnished as to the sulphur trioxide content of feed and faeces. The coefficients of digestibility averaged 47.9%. Since most of the sulphur was probably in combination with the protein of the rations, the coefficients of digestibility of the latter are given for comparison. Their average is stated as 48.4.

1200.—Influence of Feed on the Melting Point of Lard.—TEMPLETON, G. S., in *Alabama College, Agricultural Experiment Station Report*, 1918, pp. 30-31. Auburn, 1919.

The author has made an experimental study of the effect of certain concentrated feeds on the melting point of lard, in the south of the United States.

Six lots of 8 hogs were started on the experiment, but one lot had to be discarded because the ration consisting of maize +

"velvet bean and pod meal" (cake consisting of the unshelled legume *Mucuna pruriens* var. *utilis*) and tankage (4 : 4 : 1) was not acceptable. The lot fed with maize and tankage (8 : 1) dressed out satisfactorily, and produced a lard having a melting point of 44-15°C. The lot fed with maize + velvet bean and pod meal + peanut meal in the ratio 3 : 3 : 2 (not a very palatable ration) produced lard having a melting point at 42.5°C. The carcasses of the three lots fed with varying proportions of maize and peanut meal were graded as "medium soft." In these three lots, the proportions of maize and peanut meal were respectively 1 : 1, 2 : 1, and 3 : 1, and the corresponding melting points of the lard produced were, 40-35°, 40.2° and 40.57°C.

Sunflower Silage Digestion Experiment with Cattle and Sheep.—NEIDIG, R. E., in *Journal of Agricultural Research*, Vol. XX, No. 11, pp. 881-888. Washington, D.C., March 1, 1921.

The object of the experiment reported in this article was to determine the apparent digestibility of silage made from sunflowers when fed to cattle and sheep. Sunflowers have gained a wide reputation as a silage crop in the Pacific Northwest, and much interest is being taken in their growth on lands where corn can not be successfully grown. Sunflowers are a hardier crop than corn, withstanding both drouth and frost to a much greater degree. Another point in favour of sunflowers is the fact that usually a great tonnage can be secured in the semiarid regions. Many claims are made concerning the high value of sunflower silage for feeding purposes, but little is known at the present time as to its actual value other than numerous practical feeding tests which indicate that sunflowers are a very promising silage crop.

The following is a summary of the results of the experiment:

Analysis of sunflower silage fed at the Idaho Agricultural Experiment Station indicated that it compared very favourably with corn silage.

The digestible nutrients contained in sunflowers compare favourably with the digestible nutrients in mature and immature corn.

The nutritive ratio is somewhat narrower in sunflower silage than in mature or immature corn silage.

Sheep utilized slightly more nutrients in sunflower silage than did cows under the conditions of this experiment.

Where both corn and sunflowers can be grown, the selection of a silage crop should depend upon comparative tonnage per acre and cost of harvesting.

A Comparative Study of the Composition of the Sunflower and Corn Plants at Different Stages of Growth.—SHAW, R. H., in *Journal of Agricultural Research*, Vol. XX, No. 10, pp. 787-793. Washington, D.C., 1921.

The sunflower plant is gaining recognition as a silage crop in certain of the northwestern States where climatic and soil conditions are not always favourable for the maturing of corn for silage purposes. In some sections also there is a growing sentiment that sunflower silage offers a more profitable feed than corn silage, because of the greater yield that may be obtained per acre.

This paper, which is the first of a series, presents the results of a study of the chemical composition of the sunflower plant at several different and distinct stages of its growth as compared with that of corn grown under similar conditions. The purpose of the study is to assist in selecting the proper stage of maturity for ensiling.

The dry matter in sunflower and corn plants increased gradually and consistently throughout the entire period of growth. There is no great difference in the percentage of proteids in the two plants, but it is slightly in favour of the corn plant.

The reducing and non-reducing sugars in the sunflower declined somewhat irregularly but persistently during the growth of the plant. In the first stage there was about one and one-half times as much non reducing sugars present as reducing sugars. This relation was quickly changed, and in the latter stages the reducing sugars greatly exceeded the non-reducing.

The percentage of starch in the sunflower is small and rises and falls irregularly throughout the growth of the plant.

The reducing and non-reducing sugars in the corn plant rise and fall but with a marked upward trend during the growth of the plant until the stage is reached where the kernels are maturing, when a sudden drop occurs. The percentage of reducing sugars is always far in excess of the non-reducing sugars.

The starch rises and falls until the kernels are maturing, when a sudden rise occurs. The chief differences between the two plants at the silage stage lies in the amount and character of the carbohydrates. From the results obtained in this study it would seem that the best stage of maturity for ensiling the sunflower plant is when the rays of the flower have become dry and are falling.

Raising Sheep on Temporary Pastures.—MARSHALL, F. R., and POTTS, C. G., in *U.S. Farmers' Bulletin* No. 1181, pp. 18. Washington, D.C., 1921.

Sheep can be successfully and economically raised with temporary pastures. Numerous

forage crops may be used for these pastures. The kinds used should depend largely upon the soil and climatic conditions in which they are to be grown. More sheep can be raised per acre on temporary pastures than could be raised on permanent pastures on soils of equal fertility. Pasturing sheep on annual crops makes it possible to rotate pastures more frequently and thus lessen the danger of infection by stomach worms and other internal parasites. Temporary pastures, because they furnish an abundance of succulent green feed at all times, tend to increase the milk flow and make it more even throughout the lactation period. Wheat, where it can be successfully grown, provides better winter and early spring pasture for sheep than rye. Oats and field peas together make an excellent spring pasture for sheep. On rather fertile land rape is the most economical forage for sheep. Soy beans make one of the best temporary pasture crops for sheep where the soil is thin. This crop can be pastured from July until the first frost. Either alfalfa or sweet clover makes a very satisfactory pasture for sheep, but care should be used to prevent bloat. Pasturing sheep on small areas intensively cultivated makes it practicable to protect sheep from dogs by the use of dogproof fence. Specialized sheep farming provides an equal distribution of labour throughout, thus eliminating one of the principal farm problems.

FARM ENGINEERING

A New Sweet Clover Harvester.—*Scientific American*, Vol. CXXIV, No. 6. New York, February 5, 1921.

As a soil builder sweet clover is rapidly gaining favour in all parts of the country. The great drawback to a more universal use, in one sense, has been the lack of adequate machinery to harvest the seed for planting or sowing purposes. Until lately the only way to obtain the seed was to cut the crop with a binder or mower and thresh in a clover huller, and should the residue be returned to the land it would be difficult to plough under with satisfactory results. With a new harvester invented by an Illinois man it is now possible to remove the seed and the plant is left standing to be ploughed under in order thoroughly to enrich the soil.

Virtually the machine is pushed through the clover field, when in operation, by four horses, while two men operate it. One man tends to the screening and sacking while the other drives the team. The machine is carried by two wheels while the end of the tongue is supported by a centre wheel to facilitate turning at corners. A chain sprocket on the larger axle drives an over-head shaft bearing four large paddle or threshing wheels at a high speed. Parting

guides compact the stalks as they are drawn through a series of fin-shaped paddles, some rigid, others mounted on the sides of the threshing wheels. These notched paddles mesh loosely. The stalks of the plant are stiff when the seed is ripe and upon being drawn through are bent into series of angles which hold while the seed is beaten off. A draft of air drops the seed into conveyers that carry it back to a bin, where it is screened and sacked. A nine foot swath is taken by the machine in the field being harvested. The mechanism is easily raised or lowered as it is necessary.

AGRICULTURAL INDUSTRIES

Potato Seed Certification in United States and Canada.—TOLAAS, A. G., in *Potato Magazine*, Vol. 2, No. 11, pp. 18-20. Mount Morris, Ill., 1920.

A brief progress report of the seed potato certification committee of the Potato Association of America, with a tabulated summary of potato seed certification work in the United States and Canada.

Storage of Perishable Fruits at Freezing Temperatures.—CRUESS, W. V., in *California Agricultural Experiment Station, Bulletin* 324, pp. 25-43. Berkeley, Cal., 1920.

In this publication the authors review briefly previous work of Fulton and of Darrow in regard to methods of preserving small fruits in cold storage, and present the results of experiments in which fresh cherries, apricots, loganberries, strawberries, red raspberries, currants, and grape juice were subjected to different treatments before being placed in cold storage, and after several months in storage were examined for colour, flavour, and texture and used in the preparation of various products such as jellies, jams, canned fruits, preserves, candied fruits, and ice cream.

It was found that while untreated fruits, kept at cold-storage temperatures of about 32° F., lost their flavour and spoiled after about three weeks, the same fruits if held in water or sirup at from 8 to 12° retained their flavour and colour very well for at least a year. The best results were obtained by crushing the fruits with or without sugar and keeping them at a temperature of from 8 to 12°. Fresh grape juice stored at this temperature was found to have a much better flavour than pasteurized grape juice. It is suggested that former brewing plants are well equipped for undertaking the storage of soft fruits and fruit juices in this way, and that the storage of these fruits should form a profitable method of utilizing such equipment.

The Need for Uniform Grades for Hay.—McCLURE, H. B., in *The American Elevator and Grain Trade*, Vol. 39, No. 1, pp. 44-49. Chicago, 1920.

This paper, a contribution from the U.S. Department of Agriculture presented at the twenty-seventh annual convention of the National Hay Association, comprises a discussion of the work of the Bureau of Markets in the study of methods of marketing hay and the factors involved in shipping and selling hay by grades.

In discussing the chemical analyses of samples of different kinds of hay, the author states that although certain weeds, wire grasses, and other tame grasses lower the grade of timothy hay, they do not necessarily detract from the feeding value unless unpalatable or harmful, and he deprecates the practice of rejecting really good hay on account of a few harmless weeds. He notes that while analyses may determine the amount of nutrients in hay, the factor of palatability, which the animal itself must decide, is of prime importance. Tabulated data are included showing effect of environment, maturity, and fertility on the protein content of timothy, average percentage of composition of plants in market hay, total dry matter, and digestible nutrients in a ton of hay, and the actual market value of hay.

G. A. Collier, of the Bureau of Markets, led the discussion on the foregoing, outlining the plans for the establishment of Federal grades for hay.

1243.—Straining Milk.—KELLOG, E., and GAMBLE, J. A., in *Farmers' Bulletin* 1019, *United States Department of Agriculture*, pp. 14. Washington, D.C., January, 1919.

Sediment in milk indicates carelessness in its production or handling. Sediment contaminates milk and makes it less saleable. Most of the sediment in milk comes from the bodies of cows and consists of hairs, manure, bedding, etc.

Straining removes only the coarse particles of dirt and removes neither the bacteria nor the fine dirt. Straining improves the commercial quality of the milk, but does not appreciably improve its healthfulness. The best system is to prevent, so far as possible, the entrance of dirt into milk. This can be done best by having clean cows in clean stables, milked with clean hands into clean small-top pails.

Filter cloth and absorbent cotton are efficient materials for strainers. Cheese-cloth and wire gauze are less effective. Straining cloths should be changed as they become soiled. They should be thoroughly washed and sterilized after using. Efficient sterilization is accomplished by boiling or exposure to steam for at least five minutes.

The milking barn should be clean, and well lighted and ventilated. The stalls should be built with regard to the size of the cows. Droppings should fall in the manure gutter and the cows should have a clean, dry, well-bedded place on which to lie. Keep the cows groomed to remove loose hair and manure. Before milking wash the cows' udders and flanks and wipe with a damp cloth. Milk with clean, dry hands into a clean, sterilized, small-top pail. Remove the milk immediately to the milk house, where it should be strained and cooled at once. Keep milk tightly covered at all times. Protect clean utensils from flies and dust.

PLANT DISEASES

The Fungicidal Properties of Certain Spray Fluids.—EYRE, J. V., in *Journal of Agricultural Science*, Vol. 9, No. 3, pp. 283-307. Cambridge, England, 1919.

The main results obtained during 1916-1918 are given in the present article. During the first two years a number of ammonium polysulphide solutions were made according to different methods and the fungicidal value of each determined with a view of ascertaining whether a relationship existed between the polysulphide sulphur content and the fungicidal action of these solutions. During this period evidence was obtained indicating that the death point of the mildew (*Sphaerotheca humuli*) varied according to its stage of development.

In 1918, by the selection of suitable material, a method was adopted whereby any two solutions could be very strictly compared with regard to their fungicidal action. Thus it could be determined whether the nature of the polysulphide was of importance.

During 1916 it became evident that the powdery patches on the older leaves of the plant were more easily killed than those on the younger leaves. The explanation offered is that the mildew shows in its different stages of development very different powers of resistance to the same solution being very hard to kill in the stages just following infection, and comparatively easy to kill in the powdery conidial stage on the older leaves. By the selection of only those patches of mildew in the same stage of development and on young, vigorously growing leaves, it is possible to keep a sufficiently fixed standard by which to measure satisfactorily the fungicidal value of different solutions. Where, however, two solutions have to be compared under as strictly similar biological conditions as possible, it is necessary to use mildew patches in the same stage of development on leaves at the same node.

Conclusive proof has been obtained that with polysulphide solutions neither the total sulphur content nor the sulphide sulphur content gives an index of their fungicidal value. The percentage of polysulphide sulphur in polysulphide solutions appears to be the factor determining their fungicidal value which does not depend on the nature of the polysulphide present.

A Comparison of Inoculated and Uninoculated Sulphur for the Control of Potato Scab.—MARTIN, W. H., in *Soil Science*, Vol. XI, No. 1, pp. 75-84. Baltimore, Md., January, 1921.

It has long been known that the presence or absence of the potato scab organism (*Actinomyces chromogenus* Gasperini) is determined largely by the soil reaction. As a result of this knowledge studies on control measures have been based to a large extent on determining some practical method whereby the soil reaction can be so changed as to produce conditions unfavourable for the development of scab. Various substances have been tested in this connection and of these sulphur has been found to be the most promising. In its use, however, much contradictory evidence has resulted. In some instances very good control was obtained while in others it proved practically worthless. Some of the reported failures of sulphur to control scab may have resulted from the fact that the sulphur was not oxidized. It is recognized that environmental conditions play an important role in the oxidation of sulphur but the presence of sulfofying micro-organisms would appear to be of even greater importance. Boulanger and Dugardin found that the effect of sulphur on crop yields was not as marked on sterilized as it was on unsterilized soils. They conclude that this difference resulted from the fact that the oxidation of the sulphur was brought about by bacterial activities. As a result of adding sulphur to sterilized and unsterilized soil Demolon found very little sulphur to have been oxidized in the sterilized soil while a considerable amount was oxidized in that which was unsterilized. Brown and Kellogg found that each soil has a definite sulfofying power. They also found that while the formation of a small amount of sulphates was brought about by chemical action, the presence of bacteria is essential. Lipman and his co-workers have shown that elemental sulphur is readily oxidized in soils containing sulfofying bacteria. In a later paper as a result of a comparison of untreated soils with soils that had been sterilized and inoculated and others unsterilized and uninoculated, they demonstrated the biological factor to be influential in the oxidation of sulphur.

From this brief summary of a portion of the literature on the oxidation of sulphur in soils the importance of the presence of sulphofying organisms is apparent. It is very probable that the lack of these organisms in the soil might determine to a large extent the success or failure of sulphur to control scab. The experiments herein reported were conducted to determine to what extent this might be true.

The following is a summary of the results of the experiments:

The addition of sulphur to soil usually leads to an increase in soil acidity due largely to the oxidation of the sulphur by sulphofying micro-organisms. Where these organisms are absent it is necessary that they be supplied in order that the sulphur be oxidized.

On the soils on which these experiments were conducted the use of sulphur inoculated with the sulphofying organisms gave better control of scab than similar amounts of uninoculated sulphur.

In addition to the difference in control the indications are that smaller amounts of inoculated than of uninoculated sulphur may be used to obtain the same results.

Hydrogen-ion exponent values of soil samples taken from plots treated with inoculated and from those treated with uninoculated sulphur were considerably lower than corresponding exponent values of soil samples taken from check plots. In most instances this increase in acidity was accompanied by a corresponding decrease in the number of unsaleable scabby tubers.

Prevention of Smut in Wheat.—COONS, G. H., in *Michigan Agricultural Experiment Station, Quarterly Bulletin*, Vol. 3, No. 1, pp. 9-11. East Lansing, Mich., 1920.

For the treatment of wheat for the prevention of smut, which is said to be very necessary in Michigan, the author describes the soak and skim, sprinkling, and so-called dry method of treatment with formaldehyde. Where wheat is clean and without smut balls present, the dry method is considered the most satisfactory; for wheat of good grade but somewhat more subject to infection, the sprinkling method is advised; and where wheat is of low grade, that is, considerably infected with smut, the soak and skim method is recommended.

A Helminthosporium Disease of Wheat and Rye.—STAKMAN, L. J., in *Minnesota Agricultural Experiment Station, Bulletin*, 191, pp. 4-18. University Farm, St. Paul, Minnesota, 1920.

The author reports a destructive disease of wheat caused by *Helminthosporium* as being under observation for a number of

years. Common wheats, durum, and club wheats, emmer, einkorn, and rye are susceptible to infection, and many grasses were also found easily infected. The blight was found to attack practically all parts of the plant and the disease is considered to be seed-borne. Seedling blight almost always resulted from sowing diseased seed. Secondary infections occurred on the leaf, culm, and head. A strain of the causal organism which has been isolated from rye was found to infect wheat, barley, and several grasses.

For the control of this disease the author recommends the use of seed from uninfected fields and good cropping methods. While the blight is said to be due to a species of *Helminthosporium*, it is not considered identical with the foot rot described from Illinois or from other countries. The partial or almost complete recovery of many of the seriously injured seedlings is said to suggest that the disease need not cause undue apprehension on the part of wheat growers.

Fusarium Blight of Wheat and Other Cereals.—ATANASOFF, D., in *Journal of Agricultural Research*, Vol. 20, No. 1, pp. 1-32. Washington, D.C., 1920.

A preliminary report is given of the head-blighting of wheat, spelt, rye, barley, and oats, as caused by *Gibberella saubinetii*. This organism is said to attack the hosts in two different ways, producing two distinct pathological conditions. The first result is caused by an attack on the root systems and the bases of the young and later of the grown plants, while the second condition results from an attack upon some of the parts above ground. The latter may result in a rotting of the nodes of wheat, rye and barley, or blighting of the heads of wheat, spelt, rye, barley, and, less commonly, of oats and certain grasses.

The present report gives little attention to the root rot but is confined to the head-blighting of cereals. The geographic distribution, economic importance, and characteristics of the disease are described, after which the author gives an extended account of the life history of the causal organism in relation to pathogenesis. More than 30 varieties of wheat were tested at the Wisconsin Experiment Station and all were attacked more or less by headblight. Some evidence, however, was obtained to indicate differences in varietal susceptibility to this fungus.

Onion Smudge.—WALKER, J. C., in *Journal of Agricultural Research*, Vol. XX, No. 9, pp. 685-721. Washington, D.C., 1921.

Smudge is a common disease of onions occurring both in the field and in storage or transit. It is confined for the most part to

the bulbs and is characterized by dark green to black spots of variable size and shape on the outer scales. The spots may be homogeneous in appearance or may consist of numerous individual stromata scattered miscellaneously or arranged in concentric rings. The disease is most common on the white varieties of onions and damages materially the appearance and market value of the crop. The causal fungus has heretofore generally been known as *Bermicularia circinans* Berkeley, but as explained later in this paper it should more properly be termed *Colletotrichum circinans* (Berk.) Voglino.

The present investigations have been carried on with special reference to the disease as it occurs in the districts of south-eastern Wisconsin and northeastern Illinois, where onion sets are grown. The growing of white onion "bottom sets" is an industry of considerable importance in these sections, and the methods used in growing and handling the set crop are often conducive to the excessive development of smudge during and immediately following harvest. In this study attention has been given primarily to the mycological and physiological aspects of the causal organism, the relation of the parasite to the host tissue, the life history of the fungus with relation to the production of disease, and the development of remedial measures.

A detailed description of the morphology of the causal organism, *Colletotrichum circinans* (Berk.) Voglino, is given. The ascigerous form, *Cleistothecopsis circinans*, has been described by Stevens and True, but complete proof of its connection with *Colletotrichum circinans* is lacking.

The disease develops most rapidly in the field when the mean soil temperature range lies between 20° and 30° C., and is accompanied by abundant rainfall. Extremely hot, dry weather in July checks progress. Presence of moisture favours the progress of the disease during the curing period, whereas artificial drying of sets immediately following harvest checks it.

Smudge tends to promote premature sprouting and increases shrinkage of sets in storage. The disease may spread from bulb to bulb in the crate under very moist conditions, but in proper storage this factor is negligible.

The important measures of control are protection of the harvested crop from rain, rapid and thorough curing, and provision of well-ventilated storage at about 33° to 36° F.

Dodder.—HANSEN, A. A., in *U. S. Dept. of Agr. Farmers' Bulletin* 1161, pp. 21. Washington, D.C., 1921.

Dodder is a parasitic plant, infesting clover and alfalfa chiefly. It is a bad weed in Europe, although conditions in the United

States are not as favourable as in Europe for damage by dodder; hence the appearance of the pest on the farm should not occasion undue alarm. Nevertheless, dodder may cause a great deal of damage, and it should not be allowed to grow unmolested.

Dodder is usually introduced on the farm by impure seed. Other means are infested hay; moving objects, such as animals and wagons; irrigation water carrying seeds and pieces of stem; and viable dodder seeds contained in stable manure.

Dodder seed, with the exception of that of large-seeded dodder, may be cleaned from impure clover and alfalfa seed by screening. It is practically impossible to remove large-seeded dodder by screening. The seeds of field dodder are also difficult to remove entirely from clover and alfalfa seed.

During the first season of infestation in clover or alfalfa, dodder usually occurs in small scattered areas. Such infested areas should be either mowed and removed before the dodder matures seed or else burned in the field. If seed has formed, burning is the only remedy, since it kills not only the plants, but also any seeds of dodder which may be lying on the soil surface.

If the infestation is so great that patch treatment is impracticable, the crop may be either ploughed under or utilized for hay and the aftermath closely grazed to prevent seed from forming. Sheep are especially useful in grazing dodder. If dodder seed has formed and the crop has been very seriously damaged, the safest method is to cut the crop, allow it to dry, and burn it in the field.

Dodder does not attack cereals; consequently oats, wheat, etc., should be incorporated in the rotation following the infestation of the soil with dodder seeds. In place of clover or alfalfa, other legumes, such as soy beans, velvet beans, and cowpeas, may be grown, since dodder never damages any of these crops. The seeds of dodder in the soil may remain viable for a period of five years or longer.

A number of cultivated crops besides clover and alfalfa are subject to dodder infestation; the most important of these are sugar beets, onions, and flax.

Poison Ivy and Poison Sumac and their Eradication.—GRANT, C. V., and HANSEN, A. A., in *U. S. Department of Agriculture Farmers' Bulletin* 1166, pp. 16, Washington, D.C., 1920.

This publication describes the weeds and their distribution and differentiates between these and harmless similar plants. The author discusses the poisonous action of poison ivy and poison sumac and suggests preventive measures and remedies.

The methods deemed efficacious in destroying poison-ivy growth include spraying with salt brine (3 lbs. of salt to the gallon of water) repeated several times if found necessary at intervals of a week or two, pulling by hand or grubbing out small areas, frequent mowing, and in fields, ploughing followed by the cultivation, of hoed crops. When poison sumac grows along the edges of paths or roads or in frequented places it should be cut off close to the ground, after which the roots should be grubbed out or killed by applying salt, crude oil, or chemicals to the newly cut surfaces and the surrounding soil.

INJURIOUS INSECTS

Clover Stem Borer as an Alfalfa Pest.—

WILDERMUTH, V. L., and GATES, F. H., in *United States Department of Agriculture Bulletin* 889, pp. 25, Washington, D.C., 1920.

This is a report of studies made in the southwestern semi-arid and irrigated regions and particularly at Tempe, Ariz., in which regions *Languria mozardi* Latr., a native American insect first described in 1807, has become a pest of considerable importance to alfalfa culture.

The young borer injures the alfalfa plant by boring out the centre of the stems, leaving a woody fibrous stalk. A complete account is given of its life history and habits as an enemy of alfalfa culture, and of control measures. This beetle occurs throughout practically all of the United States, as well as parts of Canada and northern Mexico and has a large cosmopolitan list of food plants.

An average of about 60 days is required for the completion of its life cycle, with a minimum of 50 and a maximum of 70 days. The eggs are deposited in the stem of the host plant, and in the case of alfalfa are deposited when it has reached a stage of growth about 8 to 10 in. high. From 2 to 8 days, with an average of 3.8 days, are required for incubation of the eggs. The larvæ which pass through four molts, require from 24 to 54, with an average of 34.5, days, for development, which period is passed feeding within the alfalfa stems. After completing development, cells 8 to 10 in. long are constructed in the stems, within which pupation takes place. From 3 days in July to 18 days in June, with an average of 5.6 days for July and August, are passed in the pupal stage. In the earlier generations the adults feed for a period of 6 to 8 days, and oviposition occurs within the week following. The adults hibernate under rubbish along fence rows, ditch

banks, or other waste places. In the southwestern United States there are found to be three distinct generations each year, whereas in the eastern United States there is but one generation. The first generation in the Southwest is passed almost entirely upon yellow sweet clover, and its numbers can be greatly reduced by destroying this weed.

Its predatory enemies include the toad and a number of species of birds. Hymenopterous parasites are its most important natural enemies, three rather important species having been noted by the author. Of these *Habrocytus languria* Ashm. is the most important, often as high as 30 per cent of the borer larvæ being parasitized by it. The next most important parasite is *Heterospilus* sp. *Eurytoma* sp., was reared from *Languria* larvæ and from larvæ of *Habrocytus languria*.

The injury to alfalfa and red clover can be partially eliminated by destroying sweet clover, weeds, and waste alfalfa. The damage also can be reduced greatly by cutting a hay crop before the larvæ have had an opportunity to complete their development. The practicing of proper methods of crop rotation as well as cleanliness of farming, such as burning rubbish, etc. will also cause a reduction in numbers of this beetle. The beetle is unable to develop where pasturing is practiced continually.

Spotted Apple Tree Borer.—BROOKS, F. E. in *United States Department of Agriculture Bulletin* 886, pp. 12, Washington, D.C., 1920.

This is a report of investigations of *Superda cretala* Newman, a species which occurs locally throughout the apple-growing sections of the central and eastern parts of the United States, and is closely allied in habitat, appearance, and behaviour with the roundheaded apple-tree borer (*S. candida* Fab.). It is commonly known as the spotted apple-tree borer, the appellation "spotted" referring to the large white spots on the back of the adult. It appears to be entirely absent from many localities within its general range, while in others it is abundant, occasionally replacing to a great extent the roundheaded apple-tree borer. It was found by the author in the vicinity of Lansing, Mich., out-numbering *S. candida* probably 50 to 1, and it has been reported as common in certain parts of Iowa and Wisconsin. The present paper is based largely upon observations of specimens collected as 1-year-old larvæ in Michigan in 1916 and 1917 and transported in the wood to West Virginia, where they were removed from their feeding places and planted in the trunks and branches of living apple trees of various sizes.

The species was first described in 1838 by Newman. The author has definite locality records of this species from Massachusetts, Pennsylvania, Maryland, West Virginia, Michigan, Wisconsin, Iowa, Illinois, Texas, and Ontario, Canada, and the species is also recorded from New York, New Jersey, and Ohio. In addition to apple and wild crab apple, it has been recorded from juneberry and *Crataegus* spp., though the author has never found it attacking juneberry. The injury caused by this borer is very similar to that of *S. Candida*, except that it usually occurs higher on the tree. The round-headed borer almost invariably attacks near the ground, whereas the spotted species distributes its wounds along the central and upper portions of the trunk and among the branches. Small trees and branches, an inch or two in diameter, are most liable to attack.

The beetles issue from the wood in the spring and early summer, having been observed to appear in West Virginia from May 14 to 31, and at East Lansing, Mich., on June 26. After emergence the adults seek the foliage of the trees and feed, at times very freely, on the bark of twigs and leaf petioles, and, occasionally, on the leaves. Oviposition begins three weeks after emergence, and eggs may be laid by an individual female over a period of at least 60 days. The eggs, which are placed between the bark and the wood, hatch in about three weeks. In some cases the larval period is two years, in others three years, and occasionally, it covers four years. The full grown larvae change in the spring to pupæ, in which stage they remain from four to six weeks. The adults remain within their pupal cells from one to two weeks, and emergence therefrom may take place from the first of May to the last of June, according to locality and climatic conditions. About one-half of the beetles observed died within a month after emergence, but a few lived for a considerably longer period. One male attained an adult age of 52 days, while a female lived 93 days, having continued to oviposit up to within a few days of its death.

Woodpeckers, apparently the downy woodpecker (*Dryobates pubescens medianus*), are by far the most effective natural check to the increase of this borer. There appears to be little doubt that in apple orchards which are sprayed with arsenicals for the codling moth and other common insect pests many of the adults of this borer are killed incidentally, since the beetles feed rather freely on exposed surfaces, especially on the wrinkled bark at the base of twigs where deposits of the poison from sprays collect and adhere. The borers while small can be found and removed from the

trees very readily by paring away the bark over their burrows with a sharp knife.

1302.—*Zeugophora Scutellaris* Suffr., a Coleopteron Injurious to *Populus Deltoides* in New Jersey, United States.—WEISS, H. B., and NICOLAY, A. D., in *Entomological News*, Vol. XXX, No. 5, pp. 124-137. Philadelphia, May, 1919.

Zeugophora scutellaris Suffr., a Chrysomelid not hitherto recorded in New Jersey, was first observed in a nursery at Arlington, on June 23, 1918, where it was feeding on the foliage of *Populus deltoides*.

It is a European species, which also appears to be widely distributed in the United States (New Mexico, Illinois, and Indiana).

In New Jersey, the adult beetles were very numerous during the last week of June; they preferred feeding on the terminal leaves of which the lower surface was destroyed, the upper surface and all the veins being untouched. Later, the upper leaf tissue and the veins dry and break, leaving irregular holes.

Eggs are deposited on the leaves and the larvæ mine the tissues during July. By the first week in August, many of the larvæ are full-grown. They then leave the mines, and drop to the ground, where pupation takes place, probably during the spring. The adults appear in the early part of the next summer.

The combined action of the adults and the larvæ produces injuries that kill the foliage completely, most of it drying and falling to the ground. At Arlington, the infestation was so severe that practically every leaf of four or five medium-sized trees was attacked.

The life-history and habits of *Zeugophora scutellaris* are similar to those of *Z. flavicollis*, which is reported by Kaltenbach as injurious to *P. nigra* in Sweden and Germany.

The authors give descriptions of the egg, the fully-grown larva, and the adult form of *Z. scutellaris*.

Grasshopper Control in the Pacific States—URBAHNS, T. D., in *United States Farmers' Bulletin* 1140, pp. 16, Washington D.C., 1920.

In this publication the author outlines a programme for organized community action; gives descriptions of the common species of grasshoppers occurring in the Pacific States; discusses control on the ranges, in alfalfa fields, in orchards, vineyards, and mountain meadows, and in corn, grain, and bean fields. A detailed account is given of the poisoned bran mixture and its use.

THE INTERNATIONAL REVIEW OF AGRICULTURAL ECONOMICS.

The following is a brief indication of the contents of the more important articles in the December, 1920, number of the Institute Economic Bulletin. Persons interested in any of the articles may obtain the original Bulletin on application to the Institute Branch, Department of Agriculture, so long as the supply for distribution is not exhausted.

The Fifth General Assembly of the International Institute of Agriculture.—9 pages. A statement of the decisions and resolutions of the General Assembly of the Institute held at Rome in November, 1920.

Some Facts Regarding the Co-operative Movement in Italy.—12 pages. Contains data on the forms of co-operation in Italy, the active forces of the movement, and the organizations which constitute the framework of co-operation.

Agricultural Mutual Insurance in France from 1914 to 1919.—21 pages.

The Efforts to Arrest Rural Depopulation in Switzerland.—10 pages. Discusses the

causes why the agricultural labourers leave the country districts, the development of small holdings, the decentralization of the urban population, consolidation of holdings, the building of houses for agricultural labourers, the improvement of the system of finding agricultural employment, and social insurance.

Some of the shorter articles are: The First International Congress of Agricultural Labourers; General Meeting of the German National Federation of Agricultural Co-operative Societies; Agricultural Co-operation in Scotland in 1918 and 1919; The Swiss Peasants' Union and the Swiss Peasants' Secretariat in 1919; The Situation of the Agricultural Bank of Bulgaria; The Present Position of Agricultural Credit in Holland; Agricultural Credit Given by the Savings Bank of the Bank of Naples in 1919; The Official System of Finding Employment for Agricultural Labourers in France; Measures Taken to Prevent the Rise of Prices in France; Rural Arts in Morocco.

AGRICULTURAL STATISTICS

FOREIGN CROP PROSPECTS ⁽¹⁾

With the completion of the harvest in the southern hemisphere and the generally favourable conditions attending spring seeding in the northern hemisphere the international agricultural outlook may be described as quite satisfactory. In Argentina considerable rain has fallen recently over the greater part of the richest agricultural and pastoral regions. This weather, which at times has hindered the harvesting of corn, has in the main been beneficial to the crop, which is, generally speaking, exceptionally good. This season's wheat yield in Argentina is still estimated at 184,000,000 bushels. This estimate may or may not undergo some modification later, as at the time it was made the threshing in some regions was not far enough advanced to permit an accurate forecast of the final result. The weather, which has been unsettled lately, with considerable rain, promises a favourable soil condition for preparation for the next wheat crop.

In Australia it is believed the yield of wheat will fully justify previous estimates, as the latest official returns are now estimating the production at approximately 150,000,000 bushels. Rains are reported from various sections of the commonwealth, and the season continues abnormally wet, although this condition now can have little effect on the wheat crop. The condition and preparation of the land is more favourable than for some years past, and there are indications of a considerable extension of the wheat area in the coming season.

In New Zealand crop conditions have been fairly favourable. Recent estimates indicate that the wheat yield for the Dominion should be approximately 5,975,000 bushels, compared with 4,560,000 for the previous season.

In France recent reports indicate that heavy showers have fallen, thus relieving, to some extent, the critical situation which

⁽¹⁾ This summary of crop conditions was written on April 25, the latest date on which copy could be accepted for this number of the Agricultural Gazette.

has been existing for some time, though fears of drouth are still entertained, as the soil had become excessively dry, and larger supplies of moisture are badly needed.

In Germany the weather has been mild and springlike, though there has been a lack of rain in some sections. The crops, however, are not actually suffering from drouth, and the outlook generally is satisfactory.

In the United Kingdom, as a result of favourable weather during February and March, field work is unusually forward, and prospects are generally satisfactory. Sowings are well advanced, and are still being pressed forward under generally satisfactory conditions. Winter cereals are making good progress. A fair amount of barley has been planted, and spring wheat and oats are now being seeded.

In Belgium fine weather is facilitating restoration of the devastated territories of West Flanders. All autumn sowings have a good appearance, and the early seeded crops are described as exceptionally good. Growers are using much larger quantities of fertilizers than in the past two years.

In Roumania, according to unofficial sources, spring sowing is expected to take place this year on a larger acreage than in pre-war time. It is stated that the condition of the soil for spring sowings has been excellent, that oats and barley were seeded under favourable conditions, and that the prospects for maize planting are good. Recent estimates of the winter wheat sowings have been placed at 4,646,000 acres, or 5.3 per cent greater than last year.

In Hungary the crops are reported to be making good progress, and although a pre-war production will not be obtained, a satisfactory yield is expected.

In Italy the agricultural situation is generally satisfactory, and crop reports are of a favourable character.

In Spain climatic conditions are reported as favourable, and a good harvest is anticipated.

In India there is still a lack of moisture, and the dry conditions of this season have been little relieved, though scattered showers have recently been reported in some sections of the country. The condition of the rice crop is reported to have been generally good in the important rice producing tracts of eastern and southern India. In the central and western provinces the crop was seriously affected by prolonged drouth. The total area of rice is 78,023,000 acres, as compared with 79,426,000, the revised final area of last year. The present figure, therefore, shows a decrease of 2 per cent, compared with last year. The total yield is estimated at 28,033,000 long tons of cleaned rice, as against 31,970,000, the finally revised estimate of last year, or a decrease of 12 per cent.

In North Africa the agricultural situation continues generally satisfactory. In Algeria the favourable weather continues to encourage hopes of a good crop. In Tunis the condition of the crops has been varying, according to locality. In some sections there have been abundant rains, while in others drying winds have accentuated the dryness of the soil, thus hindering growth. In Morocco beneficial rains have fallen, but more moisture is needed to insure satisfactory crops. In Egypt the early sown crops are in good condition, while in localities where sowing took place as a result of the law restricting cotton areas, the crops are not quite satisfactory, owing to the late promulgation of that law.

"Educationists emphasize the fact that the chief object of school gardening is to broaden the children's minds, the growing of a few flowers and vegetables being only of secondary importance. The layman is likely to be most impressed with visible results. From either point of view, the establishment of school gardens is a work of conservation, for it leads directly to higher development of the nation's greatest natural resource—the soil, and of its greatest human resource—the rising generation of girls and boys."—Commission of Conservation's Monthly Bulletin.

THE AGRICULTURAL GAZETTE OF CANADA

AREAS SOWN TO WINTER WHEAT AND RYE

Country	Wheat			Rye		
	1920-21	Percentage		1920-21	Percentage	
		1919-20 = 100	Average 1914-15 to 1918-19 = 100		1919-20 = 100	Average 1914-15 to 1918-19 = 100
	Thousand acres	%	%	Thousand acres	%	%
EUROPE—						
Belgium.....	305.2	108.0		522.6	104.0	
Bulgaria.....	2,481.1	101.0	(1), 106.6	404.0	106.0	(2) 86.5
Spain.....	10,044.8	104.0	101.3	1,750.3	92.0	94.6
France.....	12,137.8	106.8	108.3	2,052.0	104.7	103.2
Finland.....	19.8	102.0	109.6	605.4	100.5	102.8
Great Britain and Ireland—						
England and Wales.....		101.0				
Scotland.....		100.0				
Norway.....	1.1	100.0		24.6	100.0	
Poland.....	1,569.1			6,872.1		
AMERICA—						
Canada.....	792.2	93.6	83.7			
United States.....	40,605.0	97.2	94.3	4,653.0	88.6	92.9
ASIA—						
British India.....	23,352.0	77.8	75.3			
AFRICA—						
Algeria (3).....	1,803.9	90.0		0.3	100.0	
Morocco.....		90.0				
Tunis.....	1,334.4	100.0	91.4			

(1) Percentage of aggregate average area under wheat (winter and spring). The area under spring wheat in 1920 was 5.6 p.c. of the aggregate.

(2) Percentage of aggregate average area under rye (winter and spring). The area under spring rye in 1919 was 7.5 p.c. of the aggregate.

(3) Not including Oran.

UNITED STATES APRIL CROP REPORT

The Crop Reporting Board of the Bureau of Crop Estimates, United States Department of Agriculture, makes the following estimates from reports of its correspondents and agents:

The average condition of winter wheat on April 1st was 91 per cent of a normal, against 75.6 on April 1st, 1920, 99.8 on April 1st, 1919, and 83.6, the average condition for the past ten years on April 1st. There was an increase in condition from December 1st, 1920, to April 1st, 1921, of 3.1 points, as compared with an average decline in the past ten years of 4.8 points between these dates. Upon the assumption of average

abandonment of acreage and average influences on the crop to harvest, condition April 1st forecasts a production of about 621,000,000 bushels, compared with 577,763,000 bushels, the estimated production in 1920, and 729,503,000 in 1919.

The average condition of rye on April 1st was 90.3 per cent of a normal, against 86.8 on April 1st, 1920, 90.6 on April 1st, 1919, and 88.4, the average condition for the past ten years on April 1st.

The condition of rye forecasts a production of approximately 66,386,000 bushels; last year's estimated production was 69,318,000 bushels; the 1919 crop 88,909,000, and the average of the preceding five years 59,933,000 bushels.

THE WHEAT IMPORT SITUATION IN EUROPE

Import figures for wheat covering approximately the first six months of the 1920-21 crop year show that the United Kingdom has practically returned to a pre-war basis. From August 1st to February 12th the United Kingdom imported about 106,000,000 bushels of wheat including flour. Before the war the total annual imports amounted to 210,000,000 to 220,000,000 bushels.

France, during the first four months of the crop year, imported 37,000,000 bushels of wheat. With this amount imported in the first four months, it is reasonable to expect that the total imports for the season will amount to 80,000,000 bushels. This quantity added to the crop of 230,000,000 bushels will bring the total supply for the year up to 310,000,000. As 360,000,000 bushels is given in the International Year Book of Agricultural Statistics as a full pre-war total for bread and seed, it appears France is approaching normal bread rations. In 1918 only 260,000,000 bushels were available for consumption.

Germany, during the first six months of the crop year, was importing at the rate of 67,000,000 bushels a year. Her pre-war

imports were from 80,000,000 to 90,000,000 bushels from August 1st to July 31st.

Holland imported, in the first five months of the present crop year, approximately 9,000,000 bushels of wheat and flour. A small quantity was exported. Before the war Holland was a heavy importer and exporter, importing an average of 80,000,000 bushels and exporting on the average 50,000,000. Net imports, therefore, averaged about 30,000,000 bushels. If the average of the first five months of the season is continued, she will have imported 21,000,000 bushels by July 31st, or only a little more than 65 per cent of the pre-war average.

Belgium has been importing since August 1st at the rate of 31,000,000 bushels a year. The pre-war imports averaged about 55,000,000 bushels.

Italy, from August 1st to November 30th, imported 28,000,000 bushels of wheat and flour. This is at the rate of 84,000,000 bushels compared with a pre-war average of 57,000,000. In the grain year 1919-20 Italy imported 86,000,000 bushels. The large amounts imported are, of course, due to the greatly decreased crops of 1919 and 1920.

THE PRODUCTION OF FLAX IN RUSSIA

The 1920 flax crop in Russia cannot meet even one-half of Russia's own requirements, according to the American consul at Helsingfors, Finland. In pre-war times Russia itself consumed about 252,789,600 lbs. of flax and exported about 650,030,400 lbs. annually. The 1920 crop amounted to only 90,282,000 lbs. Thus Russia has lost for the present an important article of export, as flax formerly occupied the third place in value among the exports of that country.

It is to be noted that before the war England had 1,120,000 spindles in operation, France 554,000, Russia 380,000, and Germany 305,000, and that the world's crop of flax was about 1,155,609,600 lbs., of which about 938,932,800 lbs. were produced in Russia.

This information is of interest in view of the many rumors regarding the amount of raw materials that Russia has to offer for foreign goods and regarding the desire of the business world to resume trade relations with that country. The area of flax under

cultivation in Russia at present is only 10 per cent of the pre-war area. The principal reason for the great decrease in the acreage cultivated is the lack of incentive on the part of the peasants. Formerly the farmers of the flax-growing regions of Russia raised flax and purchased grain and other necessities. Now the situation is changed. As the peasants are unable to purchase flour, they are obliged to raise more grain, potatoes and other foodstuffs. They are at the same time limiting the production of flax to their own requirements for fibre and flax seed. Another reason for the decrease in the flax crop is the lack of seed for sowing, as the seed has been used up for food.

The production of flax in Russia during the last four years and in 1913 was as follows:—

Year	
1913.....	1,151,998,320 pounds
1917.....	422,519,760 "
1918.....	379,184,400 "
1919.....	180,564,000 "
1920.....	90,282,000 "

THE MEAT SITUATION IN THE UNITED STATES

There was less meat produced, less exported, and less consumed in the United States last year (1920) than in either of the two previous years, although the consumption in 1919 and 1920 varied but little, the great change being in the exports. These and other facts are brought out in a series of tables recently compiled, by the Bureau of Animal Industry, showing the annual status of the meat situation for the calendar years 1907 to 1920, inclusive. The data for each year include: (1) The total slaughter which is divided into federally inspected and non-federally inspected, (2) the exports and imports, and (3) the consumption, total and per capita, of each kind of meat and of all meats combined. The same information is given for lard separately from pork. Some of the salient points indicated by the tables are as follows:

Beef growers made their supreme war effort in 1918, and during that year sent to market 15,750,400 animals, which yielded slightly over seven and one-half billion pounds of dressed beef. This number has never been approached before or since. In two years the cattle slaughterings have fallen to 12,176,400, with an accompanying decline of one and one-half billion pounds in beef production.

The exports of beef products fell from 728,000,000 pounds in 1918 to 164,000,000 pounds in 1920. This was to be expected,

as the United States for several years before the World War was not a beef-exporting country. South America and Australia are now the great sources of cheap beef and mutton, and naturally will dominate the export trade in those commodities.

Ten years ago the consumption of beef per head of the population in the United States is shown to have been 78 pounds; last year it was not quite 56½ pounds. Beef consumption in the American household has undergone a great change during this time, especially in reducing waste, and doubtless a considerable part of the difference between these amounts formerly found its way into the garbage can.

Perhaps the most outstanding feature of the domestic meat situation in recent years has been the increase in the production and consumption of veal. The demand for calf products has caused a steady increase each year for the last six years, and calves marketed in 1920 more than doubled the number in 1914 and 1915. True, the consumption of veal in 1920 was little more than one-seventh that of beef and one-ninth that of pork, yet the fact remains that it is the only class of domestic meat that has made a consistent annual gain in recent years.

The following table shows the estimated annual consumption of each kind of meat per head of the population for the last five years:

Class	1916	1917	1918	1919	1920
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Beef.....	58.1	62.0	67.8	60.0	56.4
Veal.....	5.3	6.5	7.0	8.1	8.5
Mutton and Lamb.....	6.2	4.7	5.0	6.0	6.1
Goat meat.....	0.2	0.2	0.2	0.1	0.1
Pork (excluding lard).....	75.7	58.4	72.5	70.3	71.0
Total meat.....	145.5	131.8	152.5	144.5	142.1
Lard.....	15.1	11.7	14.8	12.7	12.2
Total meat and lard.....	160.6	143.5	167.3	157.2	154.3

"Is it not possible that the experience on the farms, handling machinery, working with animals, growing crops, associated with the fundamental business of the nation and under the discipline of steady employment in the open air, is it not possible that this was just as truly educating as anything that might be conned from books or even demonstrated in a school laboratory? In the truest sense it was the very best kind of manual training, and also the wholesomest of physical training. And, could it be linked up with the theory of the classroom, it would be the quintessence of intellectual training."—Professor S. B. McCready.

THE AGRICULTURAL GAZETTE OF CANADA

LIVE STOCK STATISTICS

PRUSSIA

Classification	1st December, 1920	1st December, 1919	Increase (+) or decrease (-)	
			In number	Percentage
Horses.....	2,492,896	2,411,581	+ 81,315	+ 3.4
Cattle.....	9,144,786	8,715,410	+ 429,376	+ 4.9
Sheep.....	4,007,742	3,490,268	+ 517,474	+ 14.8
Swine.....	9,355,739	7,564,360	+1,791,379	+ 23.7
Goats.....	2,645,968	2,475,389	+ 170,579	+ 6.9
Rabbits.....	3,824,809	4,786,134	- 961,325	- 20.1
Poultry.....	37,765,042	31,198,489	+6,566,553	+ 21.0

SWITZERLAND

Classification	April 21, 1920	April 21, 1919	Increase (+) or decrease (-)	
			In number	Percentage
Horses.....	129,969	124,084	+ 5,885	+ 4.7
Mules.....	3,588	3,262	+ 326	+ 10.0
Cattle.....	1,382,116	1,433,170	- 51,054	- 3.6
Swine.....	546,122	465,306	+ 80,816	+ 17.4
Sheep.....	240,553	265,413	- 24,860	- 9.4
Goats.....	333,852	350,485	- 16,663	- 4.7

EGYPT

Classification	1920	1919	Increase (+) or decrease (-)	
			In number	Percentage
Cattle.....	561,515	505,150	+ 56,365	+ 11.2
Buffaloes.....	585,295	539,741	+ 45,554	+ 8.4
Horses.....	32,379	31,392	+ 987	+ 3.1
Asses.....	564,998	576,141	- 11,143	- 1.9
Mules.....	19,685	21,890	- 2,205	- 10.1
Sheep.....	823,542	858,107	- 34,565	- 4.0
Goats.....	333,532	325,845	+ 7,687	+ 2.4
Swine.....	21,219	21,331	- 112	- 0.5
Camels.....	103,616	117,678	- 14,062	- 11.9

INDIA

Classification	British Provinces		Native States	
	Dec. 1919 to April 1920	1917-18	Dec. 1919 to April 1920	1917-18
Cattle.....	117,428,365	.....	15,109,156	.....
Buffaloes.....	28,493,285	.....	3,910,722	.....
Sheep.....	21,983,573	22,894,571	8,187,739	9,139,235
Goats.....	24,133,710	33,165,499	4,535,046	.....
Horses and Ponies.....	1,698,940	1,680,946	277,383	203,145
Mules.....	74,698	70,940	3,138	162,796
Donkeys.....	1,371,982	1,534,341	174,720
Camels.....	407,614	499,903	141,737	91,233

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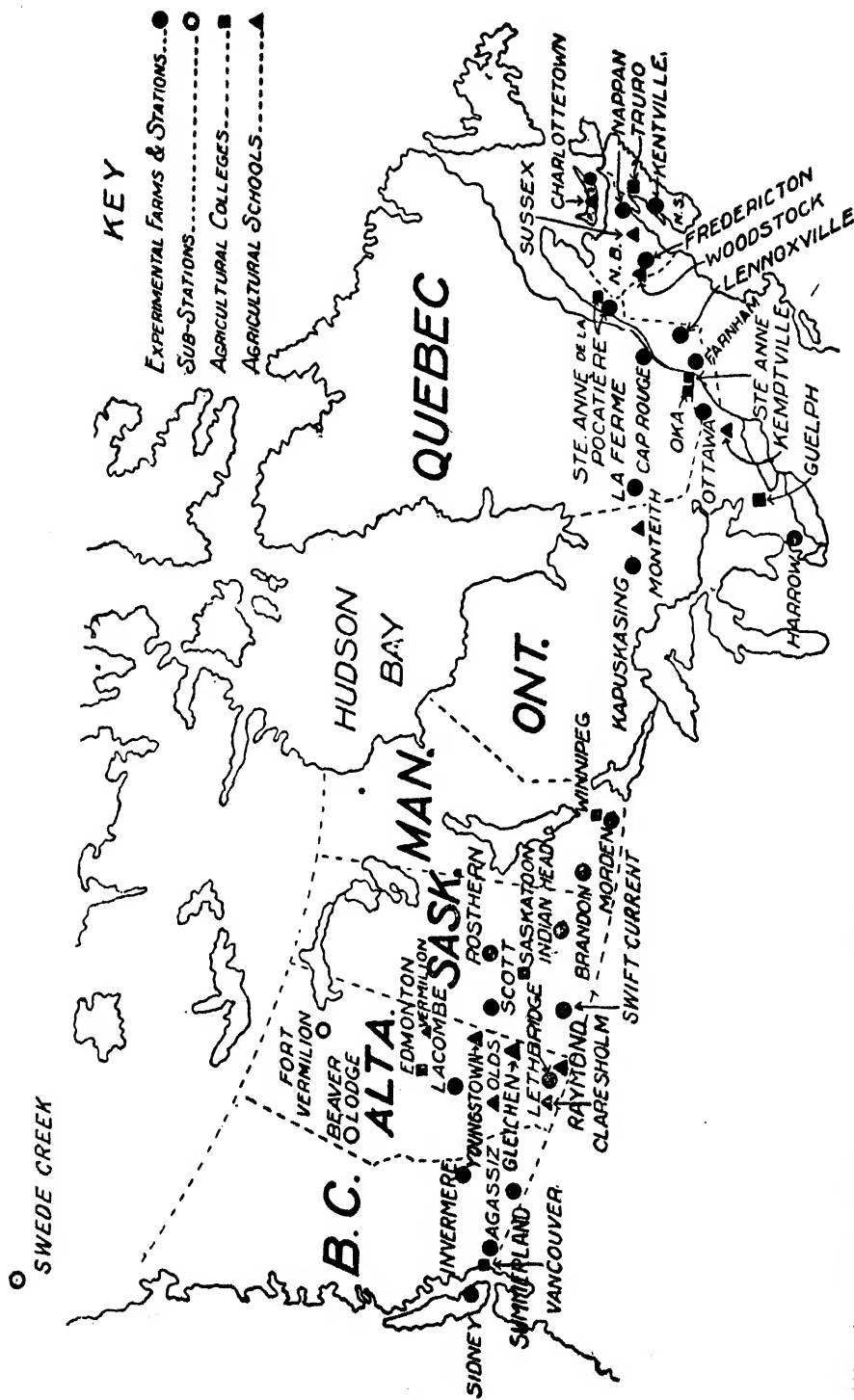
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OF CANADA

**Issued by the Dominion Department
of Agriculture, Ottawa**



MAP OF CANADA SHOWING THE LOCATION OF FARMS, STATIONS AND SUB-STATIONS IN THE EXPERIMENTAL FARMS SYSTEM, THE AGRICULTURAL COLLEGES AND AGRICULTURAL SCHOOLS

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J. B. SPENCER, B.S.A., Director of Publicity.

CANADA'S NEED FOR WIDER MARKETS FOR AGRICULTURAL COMMODITIES

THE first six months of 1921 witnessed severe declines in the prices of farm products consequent on the curtailment of exports. During the war and for some time subsequent thereto all classes of food supplies were eagerly gathered up at competitive prices in order to satisfy the insistent demand that then existed. The situation is now reversed. A world shortage may still exist, as is claimed, in meat, wheat and dairy produce, but because of the decreased purchasing power of European currencies, with the consequent inability of countries overseas to pay for the products of this continent, the demand has fallen off, and with its relaxation increasing quantities of food products have been released for home consumption.

The Government of the United States in an attempt to afford relief for the American farmer will seek to exclude by means of a tariff barrier the surplus products of Canadian farms. Canada is, therefore, brought face to face with the necessity of immediately readjusting itself to a new situation. This it has had to do before when the channels of trade on which it had become accustomed to depend were blocked. The backing-up process and the local overflow which may ensue is adding to the feeling of depression and uncertainty prevailing in the farming industry. This may and doubtless will be a temporary condition. While prices of food commodities have been the first to seriously decline, it is probable that they will likewise be among the first to recover. The deflation in prices will not end with food, but must extend to all commodities and service; and machinery, clothing and other necessities, which are still hovering near maximum prices, must in the end adjust themselves to the situation.

The question of market prospects is the outstanding one presenting itself to the Canadian farmer. To the live-stock men in particular, the question is vital. They are confronted with a duty of 30 per cent *ad valorem* on all cattle entering the United States, other than those intended for breeding purposes. Whether this means exclusion or not remains to be seen. Our cattle are in request in the meat-packing industry of that country, and may continue to be in demand, as Canada is the readiest source from which to supplement the decreasing domestic supply of that country.

Present events have once again emphasized the fact that to rely unduly on the market to the south is to place ourselves in a vulnerable position. We cannot afford to be caught with the short end of the stick whenever the United States Congress deems it expedient to deny admittance to our produce. We must seek alternative outlets and, if possible, more stable ones.

In this connection it is instructive to note that renewal has recently taken place, after a virtual suspension of six years, of shipments of Canadian live stock to the United Kingdom. The reopening of that market at the present time is a matter of prime importance to Canadian cattlemen. It is, however, a market for cattle on the hoof, which we must share on a competitive basis with the United States. The Canadian Live Stock Commissioner has supplied the following figures which are instructive at the present time as indicating the course of Canada's export trade in live cattle over a period of years. Previous to 1911, Great Britain

took 90 per cent of our exports of live cattle and the United States only ten per cent. During the period 1890-1906 the business with Great Britain increased in volume from 67,000 head to 164,000 head. From that year it declined until in 1911 it had dropped to 113,795. In 1912, only 48,000 were exported to Great Britain, and since then the trade has been merely nominal.

In 1914, shipments to the United States increased greatly in volume, amounting to 206,446. This was maintained until 1919 when an increase took place of nearly 50 per cent. In the fiscal year 1919-20 exports of live cattle to the United States reached their maximum, or 502,588 head out of a total exportation of 518,352. Since that time the decline has been rapid, and is still continuing.

The following table enumerates the agricultural products formerly on the free list, the emergency tariff duty, the volume and value of Canadian exports to the United States for the year 1920-21.

Exports from Canada to United States, 1920-21, of Agricultural Products formerly on the Free List and the Present rate of Duty.

Commodity.	Emergency Tariff Duty.	Volume.	Value.
Wheat.....	35c. per bush.	42,324,894 bush.	\$91,442,298
Wheat flour.....	20% ad. val.	1,187,750 brls.	12,023,090
Indian corn.....	15c. per bush.	8,616 bush.	16,692
Potatoes.....	25c. per bush.	4,204,684 bush.	8,328,862
Cattle (not for breeding).....	30% ad. val.	294,009 hd.	21,232,551
Sheep (not for breeding).....	\$1-\$2 per hd.	183,634 hd.	1,700,992
Meat (fresh or frozen).....	2c. per lb.	430,142 cwt.	7,740,443
Meat (prepared or preserved).....	25% ad. val.	35,802 cwt.	734,531
Wool.....	15-45c. per lb.	7,128,065 lb.	2,094,691
Milk (fresh).....	2c. per gal.	1,508,618 gal.	412,916
Milk (preserved or condensed).....	2c. per lb.	14,919,288 lb.	2,352,319
Cream.....	5c. per gal.	1,279,195 gal.	1,987,461

Certain other agricultural products at present dutiable will have to face a considerable higher tariff. The rate of flaxseed is increased from 20 cents to 30 cents per bushel; on butter, from 2½ cents to 6 cents per pound; on cheese, from 20 per cent to 23 per cent *ad*

valorem, and on apples, from 10 cents to 30 cents per bushel. Beans and onions are also affected. In addition to a specific tariff, the bill is understood to impose a further duty on goods sold below the market value prevailing in the exporting country.

PART I

Dominion Department of Agriculture

DOMINION AGRICULTURAL LEGISLATION AND APPROPRIATIONS, 1921

FOLLOWING is a synopsis of the Acts relating to agriculture passed at the 1921 session of the Dominion Parliament:—

An Act to Regulate the Grading of Dairy Produce.—This Act provides that the Governor in Council may make regulations,—

For the grading of dairy produce intended for export;

For the establishment or designation of grading stores;

For the issuing of grader's certificates;

For the special marking by manufacturers of packages of dairy produce intended to be graded;

For the establishment of standards, definitions and grades for dairy produce;

For the imposition of fees for the grading of dairy produce;

For appeals against grading to the Dominion Dairy and Cold Storage Commissioner;

As to the time when any regulation shall come into operation as to the kinds of dairy produce and districts to which the Act shall apply.

Authority is given to appoint dairy produce graders, and penalties for violation of the Act are prescribed. The Act becomes operative by proclamation.

Act to Amend the Oleomargarine Act, 1919.—By this Act the manufacture and importation of oleomargarine is permitted until August 31, 1922, and the sale until March 1, 1923.

Act to Amend the Animal Contagious Diseases Act.—The provision whereby compensation is granted for animals slaughtered is extended for three years, or until May 24, 1924.

APPROPRIATIONS

Details	1921-22	1920-21
	\$ cts.	\$ cts.
Civil Government.....	689,075 00	636,282 50
Experimental Farms.....	1,270,639 50	1,215,000 00
Entomology.....	26,000 00	18,000 00
Administration and Enforcement of the Destructive Insect and Pest Act....	190,000 00	170,000 00
Dairying.....	175,000 00	165,000 00
Cold Storage Warehouses.....	26,000 00	25,000 00
Fruit.....	145,000 00	140,000 00
Health of Animals, administration of the Animal Contagious Diseases and Meat and Canned Foods Acts, extension of Accredited Herd work, and work in connection with Bovine Tuberculosis.....	1,710,000 00	1,320,000 00
Publications.....	34,500 00	35,000 00
International Institute of Agriculture.....	10,000 00	10,000 00
Grant, National Dairy Council.....	3,000 00	3,000 00
Live Stock.....	1,000,000 00	975,000 00
Seed and Feed Control and Administration of Fertilizer Act.....	260,000 00	225,000 00
Administration of the Agricultural Instruction Act.....	10,000 00	15,000 00
Appropriations not required for 1921-22.....	350,000 00
	5,549,214 50	5,302,282 50

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Grants to Provinces under The Agricultural Instruction Act—		
Ontario.....	336,303 26	336,303 26
Quebec.....	271,113 76	271,113 76
Nova Scotia.....	81,716 69	81,716 69
New Brunswick.....	64,110 80	64,110 80
Prince Edward Island.....	31,749 22	31,749 22
British Columbia.....	69,199 06	69,199 06
Manitoba.....	77,113 11	77,113 11
Saskatchewan.....	81,728 48	81,728 48
Alberta.....	66,965 62	66,965 62
Veterinary Colleges.....	20,000 00	20,000 00
	1,100,000 00	1,100,000 00
Grand total.....	6,649,214 50	6,402,282 50

EXPORT OF ANIMALS AND ANIMAL PRODUCTS

**Canada's Enviably Record of Freedom from Serious Live Stock Diseases—
Certificates of Inspection Accepted as Guarantee by all Importing
Countries—A Quality Standard Established for Canned
Fruits and Vegetables**

BY FREDERICK TORRANCE, B.A., D.V.S., VETERINARY DIRECTOR GENERAL

NO animal, alive or dead, or any product made from a dead animal and intended for human food, can be shipped to Great Britain or to any foreign country without a certificate issued by the Health of Animals Branch of the Dominion Department of Agriculture. Every live animal going to England from Canada has to pass the inspection of a veterinary inspector before it is loaded on the boat, and its certificate is demanded on arrival at an English port. Similarly no shipment of dressed meat can leave a Canadian port until it has been certified by a Canadian Veterinary Inspector.

A similar system of inspection applies to all kinds of prepared food intended for export, such as canned meats, fruit, vegetables, jams and evaporated fruits, etc. These can be legally exported only when accompanied by a certificate of inspection. A similar system of inspection is required before similar products can be imported into Canada, and the officers of the Health of Animals Branch stand at the door to examine everything coming into Canada to ascertain that it is free from disease in

the case of live animals, and in the case of food that it has been prepared from healthy animals or sound, wholesome fruits and vegetables, and is in every way fit for human food.

From this it is obvious that the importance of the Health of Animals Branch to the export trade of Canada is very great, and that the service rendered in this way is essential to the continuance of the traffic.

Rigid Inspection

These services of our officers have been carried out very satisfactorily and have protected Canada from the invasion of animal diseases for many years, so that at the present time the health of Canadian live stock is unsurpassed and compares favourably with any other country in the world. The importance of this condition is shown in the recent arguments brought forward in connection with the agitation for the removal of the embargo against Canadian cattle in Great Britain. The Canadian argument is based largely on the fact that for twenty years or more

Canada has never shipped a diseased animal to Great Britain and that during that period no contagious disease of a serious nature has made its appearance among Canadian live stock.

Reputation Safeguarded

The inspection of meats has been carried on with regard to all exports ever since the Meat and Canned Foods Act was passed in 1907. During the war the increased demand for the feeding of the allied armies entailed a corresponding increase in the duties of the inspectors detailed for the examination and certification of these meats and it is extremely gratifying that in spite of the increased demands upon their time and the manner in which they were at times overworked, the high character of the inspection never deteriorated. At the close of the war the British Ministry of Food, through their agent in Canada, Lt.-Col. F. W. Woodward, gave this testimonial in regard to this work:—

“We are instructed to place on record the British Ministry of Food's (London) appreciation of the work that they have done, proof of which is the exceptionally small number of complaints which have been received, in number fewer than the complaints which would have been received in normal times.”

Standard of Quality

The enviable record thus achieved by the Health of Animals Branch in the inspection of meats is equally merited with regard to the inspection of other foods which come under their control. Canada is the only country in the world

which has a standard of quality and wholesomeness for canned fruits and vegetables. This standardization, although of comparatively recent date, has already received recognition in other countries where the canning industry is of importance, such as California, where they have paid us the compliment of adopting some of our standards. Foods in sealed containers, which give no opportunity to the consumer to examine them in any way, have necessarily to be bought on the consumer's faith in what the label tells him, and it is of primary importance that the manufacturers of Canada should be required to state nothing but the truth on the labels upon such goods. We are requiring the label to tell the truth on all Canadian canned goods, and similarly we require the same condition on all canned goods imported into Canada from foreign countries. The consumer is thus protected to the extent that the canned goods that he buys must be in conformity with the statement upon the label and the department is ready to investigate any report upon the quality of canned goods not up to the required standard.

The standardization of these products cannot fail to have a beneficial effect upon our export trade when the foreign public becomes aware that they are protected by Canadian laws and by Canadian inspection. In the fierce competition of modern commerce a reputation for high quality and reliable goods is a most valuable asset to any country, and the Health of Animals Branch is endeavouring to see that no food products are sent out of Canada except those which can honestly pass the required examination and receive the necessary certificate of the Branch.

THE OFFICIAL GRADING OF DAIRY PRODUCE

Dairy Produce Export Trade Must be Based on Uniform and Well-defined Standards of Quality

BY J. A. RUDDICK, DAIRY AND COLD STORAGE COMMISSIONER

THE grading of produce is not a new idea, and it is over 20 years since it was first applied to butter and cheese. As a matter of fact, the principle of grading has always been recognized in the Canadian cheese and butter trade. In selling cheese or butter at the Boards in Ontario and Quebec, the price is usually fixed on the basis of No. 1 quality. On delivery the buyer inspects the shipment and decides whether the quality is up to the standard of No. 1 quality or should be rated lower. Thus you have a rather crude attempt at grading, but its great weakness is that the grader is an interested party, to whom it is an advantage to have the grade reduced as low as possible. Such a one-sided system breeds suspicion and leads to discontent. The wonder is that there has not been greater dissatisfaction than there is. It speaks well for the character of the buyers that such a loose method should have been followed so long without serious complaint. The question before us is not so much the introduction of grading as something new, as it is the substitution of an organized system carried out by disinterested parties with a legal status and based on clear cut definitions, for the present one-sided and haphazard method.

Official, or government, grading of dairy produce has been in force in different countries for a good many years. Having been responsible for the reorganization of the grading service in New Zealand while I was dairy commissioner in that country, I have naturally watched the working out of the policy with very much interest. It is as clear to me as it can be that the

grading system has been of immense value to the New Zealand dairying industry. As an educational measure it has been a strong factor in raising the standard of quality. The confidence established in the British market and the simplification of trading has tended to popularize New Zealand produce in the Old Country, and it should be borne in mind that popularity does not rest solely on the matter of quality. Although quality is of first importance, standardization, confidence, and elimination of disputes over quality—all of which grading promotes—go a long way in building up a reputation for any article.

In Canada we now have some grading carried on under both Federal and Provincial and other authorities. It is both official and unofficial. In some cases it is carried out for educational purposes, while in others the object is purely commercial, but all the grading being done in Canada at the present time is more or less voluntary and has no authority of law behind it.

The first grading of butter in Canada was carried out in Alberta. This was followed by similar work, largely of an educational nature, in Saskatchewan, Manitoba and Ontario. The Dairy Branch of the Department of Agriculture, of Ontario, has been conducting a voluntary, or optional, butter grading service on the sample plan for the last three years. The Quebec Agricultural Co-operative Society has been grading cheese and butter in bulk for sale by auction in Montreal for some years past. The Montreal Produce Merchants' Association employs an inspector who passes judgment on the quality of but-

ter and cheese in transactions in which the members of the association are interested.

The dairy branch at Ottawa has undertaken to grade the cheeses which are to be sold by auction by the United Dairymen's Co-operative at Montreal. The grading at Montreal is on a purely commercial basis, although it is possible to use the information for educational purposes by passing it on to the instructors.

In the province of New Brunswick during the past two years, practically all the cheese manufactured has been graded for the local market by an official of the Provincial Department of Agriculture. The quality of New Brunswick cheese has shown marked improvement under this stimulus, and relatively a much better price has been obtained for it.

During the years 1917 and 1918, when the cheese was handled by the Cheese Commission and the Dairy Produce Commission, every box exported was to all intents and purposes classified into No. 1, No. 2 or "Off grade," according to the now generally adopted Canadian standards and definitions.

It may appear to the uninitiated that the grading now being done under so many different authorities and with slightly different objects in view, would show more or less lack of uniformity. I am pleased to say that observation and experience prove that this is not the case, and the work as a whole shows a very creditable degree of uniformity. This very desirable result may fairly be attributed to the general adoption

of the Dominion standards which were recommended by the last Dominion Dairy conference, and the frequent occasions on which the graders have been brought together. The Dominion Dairy Division believes it to be one of its functions to promote these gatherings and to assist in every possible way in securing uniformity in this work.

I need not point out that it would be a very long step from the present voluntary or optional grading services which are carried out here and there, to a complete or general and compulsory service for the grading of all dairy produce to be exported. In this country much of the butter made during the summer is placed in storage. It may be exported later or it may be consumed locally. To grade this butter at the time of storage would not be satisfactory unless some system of dating was employed, and to defer grading until just before export would be to lose some of the advantages of a grading system. It is in the practical application of the principle to the export trade on a Dominion-wide basis that the difficulty lies, but while great, it is not insuperable.

During the 1920 session of Parliament, a resolution, calling upon the Government to establish a grading system, was introduced in the House of Commons. It received unanimous support from the members. The Minister of Agriculture in his reply accepted the principle of the resolution, and stated that when the producers were ready to have their butter and cheese graded, the dairy branch would be prepared to carry out such a scheme.

FRUIT MARKETS EXTENSION

Efforts to Develop the Profitable Marketing of Fruits—Demonstrations in Grading and Packing—Test Shipments Being Made—Market News

BY C. W. BAXTER, FRUIT COMMISSIONER

THE geographical position of the tender fruit districts in Canada are such that the same kinds of fruit in several of the states to the south are marketed earlier than the Canadian crop. The marketing season of some of the border states is practically the same as in Canada. For this reason no great effort has been made towards building up permanent markets in the United States for these fruits. Occasionally, however, when the crops of certain kinds of fruit are short in the border states, a profitable market is found.

Tender Fruits

The lack of organized marketing facilities in some provinces has resulted in a very uneven distribution of tender fruit in medium and big crop years, large markets being overstocked while others have been under-supplied. In order to obtain a wider and more equitable distribution of the crop, it is necessary that adequate marketing facilities be established, and the Fruit Branch, consistent with the duties assigned to it, has been co-operating with the provincial departments in promoting organization. It has also been deemed necessary that standard grades be adopted for tender fruits in open packages in order that greater stability may be given the industry and the quantity shipped to long distance markets increased, thereby relieving the larger centres. Considerable attention has been given to this matter during the past year, and it is expected that grades will be adopted by fruit growers and the trade in the very near future. As the packing of fruit, loading of cars, and transportation are very important factors in the marketing of tender fruit,

practical demonstrations are given by officers of the Fruit Branch in the proper methods of packing and loading. Test shipments have been made during the past year of various kinds of fruit in order to determine the best type of car for this movement. The results so far obtained have proved of great value and it is expected that further tests will be made during the present season.

Apple Exports

Canada's exportable surplus of apples shows great variations, dependent on the size of the crop in Canada and the United States. Of the crop of 1909 over one and one-half million barrels were exported, and the following year approximately one million barrels less. During the past season the exportable surplus was approximately 1,280,000 barrels. As the greater bulk of the exportable surplus of apples each year is shipped to the United Kingdom, the Dominion Government six years ago appointed a Fruit Trade Commissioner with headquarters at Liverpool, Eng., who, during the active shipping season, devotes practically his whole time to promoting the interests of Canadian shippers both in the United Kingdom and on the Continent.

Market News Service

Through the publication of semi-monthly reports attention is called to the variety and size of apples preferred in the different markets, the possibilities of exporting other Canadian fruits, and all matters of special interest to fruit growers and shippers. Where circumstances warrant it, special reports are obtained for Canadian exporters. The prices at which Canadian

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apples and those from other countries which come into serious competition with Canadian apples, are sold, are cabled by the Fruit Trade Commissioner to the Fruit Branch after each sale. These prices are circulated among growers, shippers and dealers through the Fruit Branch Telegraphic Market Newsletter, which is issued simultaneously twice weekly from Middleton, N.S., Ottawa, Ont., Winnipeg, Man., and Vancouver, B.C., during the heavy movement, and during the period of lighter movement from Ottawa only. Although the number of Canadian exporters compared with the number of growers is comparatively small, nevertheless as the prices obtained in the United Kingdom determine values in the domestic markets to a considerable extent, the cabled prices are of interest to all. During the past

few years the cabled prices published have been in United Kingdom currency, but plans have now been made whereby the sale prices will be published in Canadian currency at the existing rate of exchange. In addition to the cabled prices for apples, the Telegraphic Market Newsletter contains wholesale prices of domestic fruit, as well as of potatoes and onions in the large markets of Canada. These reports are mailed free to any one making application to the Fruit Branch, 21 Cliff street, Ottawa. In conjunction with the administration of the Inspection and Sale Act (Fruit Marks Act), the staff of Fruit Inspectors, located in all producing districts, give practical demonstrations of the proper methods of grading and packing for the various markets.

FRUIT MARKETS INTELLIGENCE SERVICE

Successful Marketing Dependent on Information as to Conditions and Values—Reports from Reliable Correspondents Sent out Periodically by the Fruit Branch of the Department to Those Interested

BY C. W. BAXTER, FRUIT COMMISSIONER

PRACTICALLY since the inception of the Fruit Division over twenty years ago it was recognized that crop estimates and markets intelligence must be included in its activities. While the standardization secured by the enforcement of the Fruit Marks Act was a primary step in the development of the industry, successful marketing is also an essential, and this depends largely on producer, dealer and consumer having reliable information as to sources of supply and market conditions. As early as 1905, this office was issuing monthly crop reports, showing conditions in the commercial fruit districts, crop prospects and market values

in Canada and competing countries. The report in its early days comprised only a few sheets mimeographed, and sent to a comparatively small number of growers and dealers. In the past twelve or more years, however, its scope has developed, and the report now consists of from twelve to sixteen printed pages, giving detailed information regarding crop conditions for all fruits grown commercially (including potatoes and onions) in Canada and competing countries. It also contains notes on transportation matters, the package situation, special insects or fungous diseases and other items that affect either directly or indirectly the marketing of fruit and vegetables.

Monthly Crop Report

The report is compiled from data supplied by persons directly engaged in the industry who voluntarily assist us by reporting on actual conditions in their respective districts. In order to off-set the possibility of these correspondents being unduly influenced by purely personal conditions, their information is checked up by means of special reports made by officers of the Branch who are stationed throughout the fruit and vegetable producing districts. In addition, federal and provincial officers have co-operated with us to make the report the most reliable it is possible to secure.

As the crop in the United States, particularly in the western box apple district and Michigan, New York, Virginia and other large apple producing states, has a material influence on the market for Canadian apples both on this Continent and in foreign countries, special attention is paid to securing reliable information from that country; and we have correspondents (large commercial growers as well as government officers) in all the large commercial fruit, potato and onion producing districts. We are also able to include reports from the Canadian Fruit Trade Commissioner in Great Britain which give authentic information in regard to crop prospects in the United Kingdom and Continental countries. The Fruit and Vegetable Crop Report is published from June to October (inclusive), and is sent to a mailing list of some ten thousand names.

A Telegraphic Market Letter

In 1914, a semi-weekly telegraphic market report system was inaugurated. This Telegraphic Market News Letter is compiled from telegrams sent this office Wednesday and Saturday nights by members of our staff located in the principal marketing and shipping centres. In addition, we have a special representative in Great Britain, the

Canadian Fruit Trade Commissioner who, while attached to the Department of Trade and Commerce, devotes his time to furthering the interests of the Canadian fruit industry, and cables regularly the prices at which Canadian and competing fruit sells on the British markets. These quotations from the United Kingdom have been appreciated by our exporters as being of the greatest possible value in keeping them posted as to actual marketing conditions. This information, together with the prices obtaining in the various market centres and shipping points throughout Canada, is compiled Monday and Thursday mornings, printed and mailed the same day, and is issued throughout the fruit shipping season usually from the middle of August until April 1.

At first the report was published at Ottawa only, but it was soon recognized that its value depended largely on a prompt distribution and, in response to many requests for some arrangement that would insure growers and shippers in British Columbia and Nova Scotia receiving the report as promptly as those in Ontario and Quebec, during the past three years it has been published simultaneously at Vancouver, Winnipeg, Ottawa, and Middleton, N.S.

Included in this report is a statement of the car arrivals of fruits and vegetables at the principal distributing points, such as Vancouver, Calgary, Regina, Winnipeg, Toronto and Montreal. From the end of November until the close of the apple shipping season the report also contains a semi-monthly statement giving the quantity of apples still in storage in the producing districts, and also the quantity on hand in the principal distributing centres.

In the past the quotations from the United Kingdom have been printed, as received, in sterling, but we have appreciated that the prices would mean more to the average reader if converted into our own currency. Owing to lack of time it was impossible to do this if the cables were to be published in the first

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report issued after their receipt at this office. A special arrangement has now been made, however, which we expect will permit of all cabled prices being reduced to dollars and cents for use in the Telegraphic Market News Letters during the 1921 season.

Value of the Service

By means of the government market reports the producer is able to keep himself posted as to crop prospects and market conditions, which assist him in determining the price he should receive for his product and the time to dispose of it to the best value. In the same way the dealer receives information as to supplies and prices in various parts of the country, thus assisting him in buying to advantage. With reliable information

available to all, covering the supplies at home and abroad and the prices paid at all important points, the activities of the speculator are curtailed, there is a more equitable distribution and the position of the average producer, dealer and consumer is improved.

In addition to these reports, the Branch distributes special circulars relating to tariff routings, car supply, ocean space, etc., all of which have a direct relation to marketing. Requests for specific information covering such matters as the market for small fruits (fresh, frozen and pulp) in the United Kingdom, New Zealand, Australia, and the United States, the export apple trade possibilities in South America and government regulations affecting foreign markets, are also considered as an extension of our Markets Intelligence Service, and receive prompt attention.

CANADA'S BACON TRADE

An Effort to Develop Community Breeding of Hogs of the Bacon Type and Maintain Export Quality

UNDER the direction of the Federal Minister of Agriculture through the Dominion Live Stock Branch in co-operation with the provincial Departments of Agriculture, a Dominion-wide effort is being made to maintain that quality in Canadian bacon which years ago first procured for it a steady outlet in the British market. Aggressive foreign competition for Britain's bacon requirements makes such an effort of prime importance if Canada is to hold her present volume of trade. The value of bacon exports during the calendar year 1920, was \$34,000,000.

The effort will be made through the Boys' and Girls' Pig Clubs already in operation in the provinces and through similar clubs. Stimulation of interest in that type and quality of hogs which

produces the kind of bacon acceptable to the British consumer is the aim in view. Boys' and Girls' Pig Clubs lend themselves admirably to the project and every effort will be made to organize throughout Canada, a correlated move to stamp bacon quality on the Canadian hog.

Very attractive money prizes are offered to club members who feed the required type of hog, and exhibit at their local fair. The most important feature of the movement is the stimulation of community spirit, recognized as it is as being one of the greatest forces in promoting uniform and profitable production. In addition, judging competitions will be held. All competitions will be conducted in such a manner as to effectively link up production to actual market requirements, and thereby stimu-

late adherence to a standard type throughout the Dominion.

Farmers organizations, and all departmental officials will get solidly behind this move to safeguard that which by virtue of quality has become a great national industry, one of considerable financial value to the Dominion and, as well, in normal times, one of the chief sources of farm revenue.

Now that business is returning to normal channels, commercial supremacy in

the world's bacon market will again depend on superior quality, as well as on regular volume of product. Hearty co-operation of all parties interested, honest recognition of the fact that our bacon industry needs attention, and appreciation of the value of a market which annually imports over 500,000,000 pounds of bacon, can secure for Canada the premier place among the bacon exporting countries of the world.

SEED MARKET PROSPECTS

BY G. S. PEART, CHIEF, MARKETS DIVISION

THE seed marketing season of 1921 will go down in history as one of "precarious bargaining" from the seed dealer's viewpoint and one of keen disappointment from the viewpoint of the grower. From the time of the "peak" prices of the spring of 1920 to May of this year, prices declined continuously. Clovers, which were quoted \$35 per bushel, f.o.b. Toronto during May, 1920, were in slow demand at \$15 per bushel in May 1921. Lower levels were reached than prevailed in the years immediately preceding the war.

As a result of this experience in marketing, perhaps at a loss, in the sense that prices received may have been below costs of production, farmers are asking what the prospects are for a profitable market next December, January and February, and what prices may be expected. With respect to our meadows of clovers and timothy, will it be more profitable to leave for seed, or cut for hay or pasture? With regard to prospects for a seed market, we can say something, as we shall show, but what the prices will be, we can only guess, and quote "futures" from Toledo and Chicago Exchanges. On this 31st day of May, prime quality "December" red clover and alsike are quoted at \$10.45

per bushel, Toledo Exchange, while "September" timothy is quoted at \$8.50 per 100 pounds, Chicago Exchange. Of course these exchanges are price meters for these seeds on the North American continent, but like weather forecasts, they are not always reliable, and should be accepted only as an indication of market tendencies.

Based on the above futures and a possible crop of 4 bushels of red clover per acre, fair quality cleaned seed, gross receipts amounting to \$41.80 per acre, plus advantage in exchange and duty, less the dealer's commission, may be expected next December. In the case of alsike, the advantage of duty could not be added, for we are exporters of alsike while importers of red clover. These remarks are offered on the assumption that the seed will be sold in Canada to a dealer, and only as general in application, because of numerous other influences that might add or take away from the price received by the grower. Whether saving for seed will be as profitable as making hay or pasture, will of course depend on future prices of hay, livestock, beef and dairy products, which prices may also be guessed after studying market tendencies and futures, as established daily in American markets.

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Trade Returns

The following tables show last season's exports and imports of some of the more important clover and grass seeds.

Exports in bushels:	Alsike	Sweet clover	Blue grass	Timothy
To United States.. . . .	75,792	81,751	80,448	10,100
" Great Britain.. . . .	39,538	.....	.....	.....
" Europe.. . . .	9,335	.....	.....	.....
" Antipodes.. . . .	510	.....	.....	.....
Total quantity.. . . .	125,175	81,751	80,448	10,100
Total value.. . . .	\$1,693,571	\$371,075	\$159,088	\$30,300

Imports in bushels:	Red clover	Timothy
From United States.. . . .	49,549	145,412
Total cost.. . . .	\$619,072	\$705,324

The foregoing tables show the United States as our best customer for alsike and our sole customer for sweet clover, blue grass and timothy. It is to be noted, also, that imports of timothy over exports show our production of timothy for export to have been insignificant when compared with home requirements. Our exports of red clover, though not shown in the tables amounted only to a few hundred bushels, as compared with 50,000 bushels imported. A review of seed trade records indicates that the 1920-21 season figures are substantially a repetition of other years. We are exporters of alsike and sweet clover and blue grass and importers of large stocks of other clovers and timothy. It is interesting to observe that the Emergency Customs Tariff of the United States does not include these seeds and no doubt for very good reasons, perhaps as follows. We are not competitors, but customers for American grown timothy, alfalfa and red clover, while a large proportion of our alsike, which is exported to the United States, is bought by American firms for ultimate reshipment to Europe and, therefore, does not compete in United States markets with seed produced in the Eastern States.

Prospects for Clover and Timothy

Our object in elaborating these features is to emphasize the point that

The figures given were supplied by the Department of Customs and are for the period, September, 1920—April, 1920, inclusive.

prospects for a market are good for all kinds of clovers and timothy, with the possible exception of sweet clover. (There was an over-production of the latter in 1920 and, though most of it was marketed, it gave very poor returns to the growers). There was over-production for the reason that we need to depend on the United States to buy the bulk of our crop of sweet clover, which market was not open until late in the season, when it absorbed some 80,000 bushels at ridiculously low prices. As shown by our trade returns, there would not appear to be any possible danger in our over-producing red clover, alfalfa and timothy, at least for some years to come. Our home market should absorb it all, provided the quality is good enough to meet trade requirements. The latter point is well worth noticing for it is common knowledge that a good deal of our home production has been off in quality in the past and not good enough for seeding purposes. As a result, it has been exported at low values and seed of good quality has been imported from other countries to replace it.

A market for this season's surplus alsike would appear assured also. Even though the United States were to subject alsike importations to a "prohibitive tariff," which might make it impossible for American dealers to import it for recleaning and bulking for ultimate export, nothing would prevent

them buying our seed "re-cleaned" and importing under bond for re-shipment. On the other hand, perhaps more seed would be exported directly to Europe from Canada by Canadian dealers. Then in the last analysis, it is possible that the United States may need our seed for home consumption, which they would buy from us, tariff or no tariff, because there is no other source of supply directly available to them.

Reports from Western Ontario indicate a considerable quantity of low grade alsike of 1920 production still in the growers' hands. The marketing season just closed has taught a number of lessons, an important one being that it is difficult to market poor qualities

of seed and mixtures and less profitable to grow them. The markets call for seed free from noxious weeds, tolerably pure as to variety, well matured and sufficiently cleaned. Chiefly due to the high prices of the spring of 1920, world production of clovers and grasses was much increased in the 1920 crop in Canada, as well as other countries, and large acreages that normally would have been pastured or cut for hay (because of weed impurities or being in mixture) were cut and threshed for seed. The result was a market burdened with poor and mixed qualities, which not only netted the growers low prices, but had a demoralizing tendency on the market for good seed.

FINANCIAL VALUES RESULTING FROM ENTOMOLOGICAL INVESTIGATIONS

BY ARTHUR GIBSON, DOMINION ENTOMOLOGIST

IT is difficult to estimate, as a rule, in dollars and cents the actual cash values resulting from entomological research. Following results from experimental and investigational work, advice is being continually given to farmers, fruitgrowers, foresters and others, by officers of the various Divisions and Laboratories of the Entomological Branch. Such advice results in the protection of crops of all kinds from the ravages of injurious insects, which protection is worth many hundreds of thousands of dollars every year to Canada. It is impossible to follow up these constant recommendations in order to estimate their monetary value. For instance, the production of the apple crop alone in Canada depends very largely upon the results of entomological and pathological studies. Then, too, the inspection service conducted by the Branch since 1909, the year the first nests of the Brown-tail moth were

found on shipments of nursery stock imported from France, has enabled our inspectors to examine such stock from foreign countries and intercept serious pests like the Gipsy moth, the Brown-tail moth, the Ermine moth, etc. The work of the Division of Foreign Pests Suppression, under the immediate direction of Mr. L. S. McLaine, may, in brief, be compared to that of a police system which is maintained to preserve law and order. Without such system, crime would be prevalent and the country as a whole disorganized. In the absence of our plant inspection service, pests such as the above would undoubtedly become established and the country as a whole put to great expense for their control. It is impossible, therefore, to value such work in actual dollars and cents. It has, however, been possible to place a cash value on certain lines of investigation, and a brief statement of these is given below:—

Grasshopper Work

During recent years immense swarms of grasshoppers have caused very important losses in various parts of Canada. In 1915, farmers in affected localities in Quebec province treated, under the direction of the writer, 33,000 acres of growing crop with poisoned baits, with remarkable success, as a result of which a re-establishment of agriculture in the infested region was possible. In 1919 and 1920 serious outbreaks occurred in the Prairie Provinces. In the former year, Dr. A. E. Cameron, lately in charge of our entomological work in Saskatchewan, and Mr. M. P. Tullis, of the Provincial Department of Agriculture, estimated that wheat crops to the value of \$2,000,000 were actually saved in that province as a result of the campaign of control. In the same province in 1920, the provincial authorities have estimated that 1,400,000 acres of crop were actually saved by treatments of poisoned bait. As Mr. Tullis mentioned at the Grasshopper Conference held last autumn in Winnipeg, "the money value of the crops saved after making all allowances for light yields, destruction by hail, drought loss, etc., is very great and the figures given reach such a high total, exceeding \$20,000,000, that we hesitate to submit them as the official estimate." In the province of Manitoba in 1920, as a result of the activities of federal and provincial officers, particularly Messrs. Criddle and Mitchener, it has been estimated that the value of crops saved in the province amounted to over \$17,000,000. In the province of Alberta, the grasshopper campaign in 1920 was directed by Mr. E. H. Strickland, Dominion Entomological Laboratory, Lethbridge, and he has estimated that crops to the value of over one million dollars were saved to farmers who followed our recommendations. To the Entomological Branch belongs the credit of first demonstrating, under large acreage conditions, the value of sawdust as a cheap carrier for poison. In

Saskatchewan, it is expected that a larger quantity of poisoned bait than was used in 1920 will be required this year, and from the use of sawdust in the poisoned bait, in 1921, provincial authorities have estimated that there will be a saving of at least \$40,000. This saving refers to the province of Saskatchewan alone. This cheap carrier is now used in other countries beside Canada. Through our efforts, too, salt is now being largely used as an attractant.

Forest Insect Control in British Columbia

Bark-beetle control work in the Merritt district of British Columbia conducted last winter and spring, under the direction of Doctor J. M. Swaine, Chief of the Division of Forest Insects, and Mr. Ralph Hopping, in charge of forest insect investigations in that province, has proved most effective. With the completion of similar work in 1921 the further spread of the infestation in the above district will be prevented, resulting in the saving from total destruction of approximately three hundred million feet of yellow pine worth more than six million dollars, and at a total cost of less than \$50,000. This control work was commenced in the winter of 1919-20 to save the timber in the above district, in which the beetle outbreaks were spreading rapidly. Previous investigations indicated that the forests in the infested areas would have been entirely ruined within the next five or six years. Control work consists of modified logging operations involving the cutting of infested trees and the destruction of the broods of beetles overwintering in the bark, either by utilizing the timber and burning the slash or by burning the entire trees.

In the valleys about Princeton these beetles have been spreading for eight years and they have already killed over one hundred and fifty million feet of yellow pine worth three million dollars. They threaten to ruin almost com-

pletely the whole yellow pine stand of the Princeton-Merritt-Kamloops area, comprising between one and two billion board feet of timber worth to the province in labour, supplies, stumpage and lumber between twenty and forty million dollars. A rapid extension of the control methods demonstrated by the Division of Forest Insects will undoubtedly save this timber from apparently certain destruction. This work is conducted in co-operation with the federal and provincial forestry branches.

Insecticide Investigations

In the province of Nova Scotia the results from the researches of our insecticide entomologists, particularly Messrs. G. E. Sanders and A. Kelsall, are worth many thousands of dollars to fruit and potato growers. Some of these findings are, briefly, as follows:—

New copper arsenic dust. This new dust for orchard trees, discovered by one of our own officers, resulted in a saving to growers in the Annapolis valley in 1920 of \$20,000. During the present year it has been estimated that from the use of this dust there will be a saving of at least \$42,000.

Substitution of arsenate of lime for arsenate of lead. The adoption of our recommendations to apple and potato growers in the above province to substitute arsenate of lime for arsenate of lead in Bordeaux mixture resulted, in 1920, in a saving of \$16,200.

Adoption of Thomson Bordeaux mixture and dusting in place of lime-sulphur spray by Nova Scotia apple growers. To our insecticide entomologists must be given the entire credit for the change which has developed in spray mixtures used in the Annapolis valley. Crops were not being secured by apple growers, and investigations showed that this was owing to the sprays applied, namely, lime-sulphur mixtures. Bordeaux mixture was then advocated in place of lime-sulphur, and by the adop-

tion of our recommendations, Nova Scotia growers are now securing 200,000 barrels of apples per year more than they obtained during the years that they used lime-sulphur. Estimating these apples at \$2 per barrel on the trees, the value of our work in this regard must be placed around \$400,000.

Cabbage Root Maggot Control

In the provinces of Ontario and British Columbia the Entomological Branch has, during the last three years, demonstrated under commercial conditions the value of corrosive sublimate as a remedy for the Cabbage Root Maggot. This work followed experiments conducted by the Division of Field Crop Insects in the Ottawa district. During 1920, many growers in Ontario used this remedy for the first time. In sections of the United States, too, it has also been adopted as a result of our success. We have estimated that in Ontario alone at least \$50,000 worth of crop was saved in 1920. In British Columbia, during the past year, one plantation consisting of 25,000 cabbages was treated under the direction of Mr. R. C. Treherne, the representative of the Branch for that province, the grower obtaining as a result of the application of corrosive sublimate 100 per cent marketable heads. When this remedy becomes more widely used in Canada there is every reason to believe that it will be worth many times the above amount, not only to commercial cabbage growers, but to growers of cauliflowers as well.

Rose Midge

This insect during recent years, particularly in 1919, caused very serious losses to roses grown under glass in the province of Ontario. Following investigations conducted chiefly by Mr. W. A. Ross, in charge of the Dominion Entomological Laboratory, Vineland Station, Ont., we were able to demonstrate the value of tobacco dust as a remedy

for this pest, and during the past year important growers whose premises were infested followed our recommendations with perfect success. Tons of tobacco dust have been used by Ontario rose growers, which dust was obtained

through the efforts of the Entomological Branch, whose officers found a sufficient source of supply and arranged for its distribution. The results of these investigations in 1920 were worth at least \$50,000 to Ontario rose growers.

MOSQUITO CONTROL IN BRITISH COLUMBIA

Varied Habits Among Mosquitos Make Uniform Legislation Impracticable —Small Prospect at Present of Exterminating the Pest in the Fraser Valley

MR. Eric Hearle, the Federal officer in charge of Mosquito Investigations in British Columbia, in an article appearing in a recent issue of the *Agricultural Journal* of British Columbia, reviews the Mosquito Act of that province, recently repealed, and presents the reasons why the Act became inoperative. One of the chief difficulties met with was the fact that owing to the varied habits of mosquitos, the legislation was not applicable to all species. "This legislation," states Mr. Hearle, "would have been admirably adapted to cope with certain mosquito pests where the troublesome species were general breeders with a small range of flight. The mosquito nuisance in parts of Eastern Canada and in the eastern United States is sometimes caused by 'household' mosquitos such as the eastern rain-water barrel mosquito and certain *Anopheles* mosquitos which have a small range of flight, and which, as a general rule, do not wander many hundred yards from the vicinity of their breeding places. There are, however, more than 500 known species of mosquitos, and among them there is an extremely wide range of habits. Some species remain strictly in the vicinity of their breeding places, while others have been known to migrate forty miles. With such a diversity of habits among mosquitos, legislation suitable for the control of certain spe-

cies may be totally ineffective for a pest where other forms are the cause of the trouble. In the Fraser valley (where a detailed study of the pest is being undertaken by officers of the Dominion Entomological Branch) the two species constituting the pest are capable of spreading over areas many miles from their source of origin; so that legislation to be effective must treat the pest as a whole and take in the entire mosquito belt in its scope. Otherwise the most careful work done by one community might be rendered useless by neglect on the part of another community. Mosquitos are sometimes actually worse a few miles away from their breeding places than in the swamps in which they were bred.

"The investigators found that out of a mosquito fauna of over twenty species only two assumed economic importance and these occurred in great numbers only when the river freshets exceeded certain levels.

"Little real progress in controlling the mosquito pest of the Fraser valley can be expected until the larger areas subject to flooding have been reclaimed by dyking, pumping and ditching. Reclamation work is now being undertaken on the largest of the remaining breeding areas—Sumas Prairie—where untold millions of mosquitos are produced at flood time. The cleaning up of this huge breeding area of 34,000

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acres will be a great step forward in the control of the pest, and will have an important effect on the agriculture of the district, especially on the dairy industry, as the drop in the milk flow is one of the most important effects of a serious mosquito outbreak. There are a number of other breeding areas which will need reclaiming before the pest is appreciably reduced, and until

they have been reclaimed it will not be feasible to deal with the smaller areas by artificial methods." It is Mr. Hearle's opinion that there is little hope of much being accomplished until the municipalities, and other interested governing bodies in the affected area, co-operate to deal with the pest as a whole and vest their authority in a central Mosquito Control Commission.

THE PUBLICATIONS BRANCH

How the Publications of the Department of Agriculture are Distributed to those Likely to Benefit from them—The Agricultural Gazette, a Medium for Acquainting the Public with the Value of Departmental Work

THE Publications Branch of the Department of Agriculture is charged with the distribution of departmental publications both in English and in French and with the issuing of *The Agricultural Gazette of Canada*.

The publications include annual reports and the bulletins and leaflets issued from time to time by the several Branches. In addition to these, the Branch distributes news letters and market reports, as well as special articles and reviews for the use of the newspapers and the agricultural press.

The compilation of mailing lists covering the whole of Canada and their continual revision to insure their being kept up-to-date is an arduous and somewhat complicated undertaking. Of these addressing lists, the General Mailing List alone comprises 222,000 names, classified and subdivided. These lists may be combined in any manner desired, so that the persons whose names appear thereon receive such publications as are likely to interest them and no other, thus making for economy in distribution. The names comprising the General List are obtained in various ways, but chiefly through the distribution of return postcards, by means of which the applicant signifies his desire to be placed on the list for such classes of publications as he may specify.

It was formerly the practice to send to each person on the list all publications of the class in which he had indicated interest. For reasons of economy, however, it has been found necessary to reduce the supply of bulletins very materially, and the majority of the department's publications are now sent only on special request. The fact that a person's name is on the mailing list for a certain class of publications will not insure his being sent all publications of that class, but only those that are published in such quantities as to be available for general distribution.

This change of policy, which was determined upon by the Government Editorial Board, while working in the direction of economy, has led recently to a good deal of unavoidable misunderstanding and complaint on the part of persons who assumed that everything would be sent them as a matter of course when once their name was on the list. To meet the situation the Branch now sends out with *Seasonable Hints*,—a periodical that goes to everybody on the addressing list—a circular giving the titles of such publications as are available only on request.

In order to meet the requirements of the Editorial Committee as to list revision, the Branch is now issuing a cir-

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cular to all persons appearing on the general mailing list, requiring them to notify the Branch if they desire to continue to receive the departments' publications. The names of those who do not respond will be dropped. The task of revision, in order to avoid complete disorganization of the system, will require about a year to accomplish. It is anticipated that with the curtailment in the lists, which will necessarily follow revision, a greater number of publications can be sent to those whose names are retained than has been the case in the immediate past. So far as *Seasonable Hints* is concerned, the list will remain intact, and will constitute a medium for reaching, when necessary, everyone of the 250,000 names appearing thereon.

Another list is known as the "Special General." It includes members of Parliament, members of the legislative assemblies, newspapers, consuls, libraries, and the principal officials of the Dominion Department and of the provincial departments of agriculture. To the 3,250 names appearing on this list is sent everything issued by the department. There are also lists of agricultural college officials, agricultural representatives, secretaries of agricultural societies, United States agricultural officials, and of persons, newspapers, and institutions, both Canadian and foreign, who have expressed a desire to receive the publications of the department.

A number of branches of the department have compiled special lists of their own of persons and organizations who are interested in technical publications, regulations issued under Acts of Parliament, circulars to importers, exporters, produce dealers, and drovers; news letters, market reports and similar communications. Material of this kind is despatched by the Branch as required.

The day-to-day requests for publications, in English and in French, are

numerous and require to receive special and prompt attention. They often include requests that have to be referred to other departments of the Dominion Government, and sometimes to provincial government departments. In order to meet them satisfactorily, discrimination and experience is called for on the part of those in charge of the work.

During the past five years, the Publications Branch has distributed upwards of 13,000,000 copies of publications of various kinds, with the object of placing in the hands of those interested the results of the work carried on by the department in the interest of the agricultural industry. In the year 1920 2,260,850 copies of publications were distributed, of which some 410,175 were sent out in response to direct request. Under the changed procedure indicated above, the number of special requests will without doubt become far more numerous than in the past.

The addressing work is done automatically by machinery from embossed name and address plates, with the exception of the special request addressing, which is necessarily done by hand. The address plates are made by the Branch. The folding of circulars and the sealing of envelopes is also now being performed by machinery, but not the filling of envelopes—a work involving considerable labour where a large edition like that of *Seasonable Hints* has to be despatched in a comparatively short period of time.

The following table shows the number and character of the publications issued during the past twelve months:—

Reports..	15,719
Bulletins..	234,314
"Seasonable Hints"	712,911
Pamphlets..	117,629
Circulars..	168,155
Leaflets..	27,058
Announcements, Application Mailing List Cards, Posters, etc. . .	922,316
<i>The Agricultural Gazette</i>	64,748
Total..	<u>2,262,850</u>

The Agricultural Gazette

The publication of the *Agricultural Gazette of Canada* was begun seven years ago in response to a demand for more widespread information in regard to the work being carried on by the departments of agriculture. Its pages are not limited to Dominion work alone but are equally at the disposal of provincial departments of agriculture, and also of education, insofar as the work of the latter relates to agriculture. It is not intended that this magazine shall cover the sphere of technical work nor, to any extent, of applied agriculture, so that in no sense does it intrude upon the field of the agricultural press. It is published both in English and in French. No payment is made for contributions.

In addition to giving a more extended publicity to governmental work on behalf of agriculture, the *Gazette* was originated with the object of keeping agricultural workers informed as to what was under way in other provinces and to acquaint them with the methods adopted elsewhere, thus enabling them to keep in touch with the progress being made in this field of endeavour. These objects are of great importance to the agricultural industry, and the response on the part of Dominion and provincial officials has in the main been very gratifying, and by degrees more are coming to realize the opportunity that this periodical places at their disposal for advertising their work before the public and for creating wider popular appreciation of

the various forms of endeavour engaging their attention. The knowledge on the part of the public, and also of the farmers themselves, of the work carried on in the fields of experiment, research, investigation, and demonstration by government institutions is for the most part very limited, and one of the leading objects of the *Gazette* was to secure greater recognition and appreciation of these endeavours, and a fuller realization of what they signify to the country's welfare. The *Gazette* is also the medium through which publicity is given to the agricultural information and statistics issued by the International Institute of Agriculture.

Beginning with the first of January, 1920, the *Gazette* was made a bi-monthly instead of a monthly publication. It is not intended for general distribution, but sent free only to members of parliament, Dominion and provincial, to the newspaper and agricultural press, to agricultural officials, provincial educational officials and teachers of agriculture, to school and college and other libraries, technical agricultural workers and to persons who act as crop correspondents for the Agricultural Statistical Branch of the Department of Trade and Commerce. There is a foreign exchange list, and a small list of paid subscribers. The *Gazette* mailing list comprises, all told, 9,700 names.

Early in 1921 the Branch took up new quarters at 70 Queen street, where better facilities are offered for the efficient performance of the work.

THE INTERNATIONAL INSTITUTE OF AGRICULTURE
—REPORT OF PROCEEDINGS OF THE
GENERAL ASSEMBLY, 1920

BY T. K. DOHERTY, B.A., LL.B.

THE Commissioner of the International Institute Branch attended the meetings of the Fifth General Assembly of the International Institute of Agriculture, held at Rome November 3-11, 1920. These meetings, the first since 1913, were under the general direction of the Permanent President, Hon. Edouardo Pantano, Italian ex-Minister of State, and under the Chairmanship of Hon. Senator Maggiorino Ferraris, also an ex-Minister. One hundred and fifteen delegates, representing 48 Governments, were in attendance, including practically all the European countries except Austria and Turkey. Great Britain and Ireland had seven; United States six, Spain, Sweden and Japan, each four; Belgium, China and Holland, each three; France eleven, and Italy thirteen.

The British delegates were Sir Daniel Hall, K.C.B., F.R.S. Chief Scientific Adviser to the Ministry of Agriculture and Fisheries, Mr. R. J. Thompson, O.B.E., Assistant Secretary to the Ministry of Agriculture and Fisheries, Sir Robert Wright, LL.D., Chairman of the Board of Agriculture for Scotland, Mr. T. P. Gill, Secretary to the Department of Agriculture and Technical Instruction for Ireland, together with Mr. J. H. Hinchcliffe and Miss Laura Stephens, of the same Department, Sir Thomas Elliott, Bart. K.C.B., ex-Permanent Secretary for Agriculture and Delegate for Great Britain and the Dominions on the Permanent Committee of the Institute, Dr. C. O. A. Barber, of the University of Cambridge, recently of India, Dr. I. Levi, Assistant Controller, Egyptian Department of Statistics, and Mr. Gilbert Storey, Egyptian Entomologist.

The Proceedings of the General Assembly were, as usual, opened by His

Majesty, Victor Emmanuel III, King of Italy, on whose behalf it was announced he had made an additional grant to the funds of the Institute of one and one-half million lire from the resources of his private estates. The funds are to be used for the purpose of extending and improving the Institute Palace as may be required.

In the inaugural addresses many eloquent references were made to Mr. David Lubin, the founder of the Institute, who died in January, 1919, after a notable career. It was enthusiastically and unanimously resolved that a marble bust, the work of the eminent artist, Mario Rutelli, be placed in the splendid atrium of the Institute Palace to commemorate Lubin's great work, and that the chair generally occupied by him in the Assembly Hall be inscribed with his name and remain permanently vacant as a further tribute to his memory. The ceremony of unveiling the marble bust took place on March 24th in the presence of His Majesty, the King of Italy, and a large number of diplomats, including the American Ambassador to Italy.

The Canadian delegate is under deep obligation for the valuable advice and support of Sir Daniel Hall and Sir Thomas Elliott, whose rare administrative and diplomatic knowledge and experience were placed unreservedly at his service.

The authorities in various Departments of the Italian Government and of the Colonies and the Syndic of Rome spared no pains in assisting the deliberations of the Assembly and in showing courtesies to the delegates.

The decisions on the financial problem were chiefly based on the full and satisfactory report of the Vice President of the Institute, Mr. Louis Dop, of France

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The contributions of many adhering countries, especially those of Central Europe, fell into arrears during the war, and the Institute's resources were otherwise affected by the rise in the cost of printing and of the personnel. Instead of the more ambitious programme of work which had been specially recommended in the Vice President's report, it was decided to provide for the carrying out of the work in hand before the war and which, with an additional bonus of 500,000 lire to the staff, would require an annual expenditure of 2,800,000 lire against estimated receipts for each of the two years 1921 and 1922, under the existing contribution of only 1,351,000 lire. To meet the difference representing increased expenditure, it was decided to ask the adhering Governments to make a supplementary contribution for the years 1921 and 1922 only, equal to one and one-half times the ordinary contribution payable by each country in its own money on the basis of the par value of the franc. The General Assembly, while approving of this necessary expenditure for these two years, deemed that the supplementary payment could be regarded only as provisional, and that the normal organization of the Institute, its administration, its staff and its work must depend on its actual financial position on the date of the next General Assembly, in 1922.

With reference to the statistical policy, the British and American delegations insisted on the allotment of an adequate proportion of the contributions to the statistical services. The proposals for

greater speed in the collection, transmission and publication of crop reports, introduced at the Institute by the Canadian delegate in 1913 and in the interval favourably reported upon by the Permanent Committee, were finally unanimously adopted by the General Assembly. Crop reports are to be henceforth cabled by the Governments to the Institute on or before the 10th of each month, and the Institute is to cable, in return, a couple of days later a summary of the world's data. Moreover, in order to expedite the work, in addition to official information semi-official data may, with the authorization of the Governments concerned, be used.

In connection with all the Institute's services a system of continuous correspondence between the Governments and the Institute, and the establishment for that purpose of a special bureau, is recommended on the lines followed by the Canadian Office and commended in the Institute's official report to the Assembly. At the request of Japan, tea was added to the products to be regularly reported upon.

There were introduced into the classifications of the various kinds of live stock some changes to be made in annual and census statistics, compliance with which require corresponding changes in many adhering countries, including Canada. For the purpose of comparison the Institute's classification is here placed in columns parallel to those giving the classification adopted in Canada for the decennial and annual censuses.

Classification adopted by the Institute	Classification used in Canadian annual statistics	Classification to be used in Canadian census of 1921
<i>Horses—</i> 1. Colts and fillies under 3 years. 2. Stallions, 3 years and over. 3. Mares, 3 years and over. 4. Geldings, 3 years and over.	<i>Horses—</i> 1. Stallions, 2 years and over. 2. Mares, 2 years and over. 3. Geldings, 2 years and over. 4. Colts and fillies under 2 years.	<i>Horses—</i> 1. Colts and fillies under 1 year of age. 2. Colts and fillies, 1 year old and under 2 years of age. 3. Mares, 2 years old and over. 4. Geldings, 2 years old and over. 5. Stallions, 2 years old and over (for breeding).

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Classification adopted by the Institute	Classification used in Canadian annual statistics	Classification to be used in Canadian census of 1921
Cattle— 1. Calves, under one year. 2. Steers, bulls, heifers from 1 to 2 years. 3. Heifers and cows over 2 years (including heifers and cows in milk). 4. Bulls, over 2 years. 5. Steers, over 2 years.	Cattle— 1. Bulls for breeding. 2. Milch cows. 3. Calves, under 1 year. 4. Steers, 2 years and over. 5. All other horned cattle.	Cattle— 1. Calves, under 1 year of age. 2. Heifers, 1 year and under 2 years of age. 3. Cows in milk or in calf, June, 1921. 4. Cows and heifers, 2 years and over. 5. Steers, 1 year old and under 2 years. 6. Steers, 2 years old and over. 7. Bulls for breeding, 1 year and over.
Sheep— 1. Lambs, under 1 year. 2. Rams, 1 year and over. 3. Ewes, 1 year and over. 4. Wethers, 1 year and over.	Sheep and Lambs—	Sheep and Lambs— 1. Lambs, under 6 months old. 2. Ewes, 1 year and over. 3. Rams for breeding, 1 year and over. 4. Wethers, 1 year old and over.
Pigs— 1. Pigs under 1 year. 2. Breeding boars, 1 year and over. 3. Breeding sows, 1 year and over. 4. Other pigs, 1 year and over.	Swine—	Swine— 1. Young pigs under 6 months old. 2. Sows kept for breeding, 6 months old and over. 3. Boars for breeding purposes, 6 months old and over. 4. All other pigs, 6 months old and over.
Goats— Total for all animals.		

The ultimate object of the Institute is to bring into existence statistics to a great degree comparable. It is much to be desired that the various countries should, in the interests of uniformity, make the desired changes. On the principle that classifications which are too general do not furnish definite enough information on which to base actual breeding and cultural operations the Institute classifications seek greater detail than has hitherto been usual in many countries.

Favourable action was taken on the proposals made by Great Britain and Belgium asking the Permanent Committee to investigate and report to the next General Assembly the expenditure incurred by the different Governments in the interests of agriculture. Three proposals were made by the Delegations of Great Britain, Belgium and Italy, asking the Institute to publish the results of inquiries into the methods adopted during and immediately following the war for the purpose of increasing agricultural production. An elaborate scheme of inquiry was adopted, based on the carefully prepared schedule submitted by Sir Daniel Hall.

On the proposal of the American Delegation the Assembly expressed the wish

that, in view of the importance of the rapid transmission of reliable information to the different Governments in respect to agricultural conditions, the condition of crops and of livestock, and in respect to available stocks and market conditions, the Institute should recommend to the adhering Governments the expediency of appointing agricultural attaches to the different embassies of the countries between which there exist importation and exportation of agricultural and animal products.

Mr. Louis Dop of France made an important and interesting report on agricultural meteorology, the conclusions of which were adopted. They provided for the creation of a Permanent Committee of Agricultural Meteorology, whose members shall be named by the Ministers of Agriculture of each country and chosen among the meteorologists, agronomists, botanists, plant pathologists, and related scientists.

The Governments are requested to ratify as soon as possible the International Convention of Plant Pathology of March 4, 1914, or approve its conclusions and consent to organize in their own countries the necessary Departments of Plant Pathology.

THE AGRICULTURAL GAZETTE OF CANADA

The General Assembly recommends that the Governments represented at the International Conference for the Control of Grasshoppers ratify the Convention of October 31, 1920, or approve its conclusions as soon as possible. The report of Mr. T. K. Doherty, Canadian Delegate to this Conference, will be published later.

The Governments are requested to organize on a uniform plan accountancy bureaux with a central bureau in each country, and the Institute is to utilize in its statistical and economic publications the results obtained and published by these Bureaus.

The proposal of Professor Eriksson of Sweden for the creation of an International Research Institute of Plant Pathology was favourably reported upon and adopted. The Institute is to be entrusted with the collection of all the publications and materials concerning plant pests and the enemies of plants (herbaria, collection of insects, etc.).

It was proposed that through scholarships, to be provided by Governments or private individuals, agricultural students be afforded an opportunity of visiting the Institute and spending some time there for the purpose of study and investigation, in which work they would also be aided by the Italian Government.

The Assembly adopted without discussion Mr. R. J. Thompson's proposal that with the aid of the Governments there be established a Consultative Committee of the specialists of each country for the purpose of co-operating more directly with the different Bureaus of the Institute, and meeting in annual conference in Rome.

The Assembly did not consider favourably the motion of the American Delegation that the precedent created by the Peace Conference, the League of Nations and the International Bureau of Labour in the concurrent use of the English and French languages should be recognized and acted upon by the Institute. It was decided that the question might properly be placed on the

programme for discussion at a future General Assembly. A debate ensued, in which the Canadian Delegate participated, in the course of which there were expressed opinions favourable to the translation of all the Institute Proceedings and publications, also to abandoning the metrical system for the "Bulletin of Statistics" and adopting expressions of area and capacity more readily understood in English speaking countries.

In addition to the practice of publishing monographs and Bulletins the Assembly approved the suggestion of the Bureau of Economic and Social Intelligence that there be published a Year Book of Economic and Social Institutions, also a dictionary of technical words used in their work. However, the publication of the Year Book and dictionary will have to wait the provision of adequate funds and, in the meantime, the requisite material will be collected.

The Assembly dealt at length with the question of agricultural labour, which it was believed was to be discussed at the forthcoming Conference of the International Bureau of Labour at Geneva. There was a consensus of opinion strongly opposed to the fixing of an eight-hour day or even to the consideration of the claims of agricultural labour by delegates who formulated the demands of town labour and did not understand agricultural conditions. It was declared that the study of all that related to the conditions, economic, juridical and social, and the life of agricultural workers, should belong to the Institute and should be taken up on a more thorough scale than circumstances had hitherto permitted. The motion, asking that agricultural labour be withdrawn from the programme of the International Labour Bureau was finally dropped, and the Institute agreed that the report of the lengthy and interesting debate on the subject be specially published and sent to the Ministers of Agriculture and

THE AGRICULTURAL GAZETTE OF CANADA

of the Interior of all the adhering countries.

In connection with the League of Nations the General Assembly expressed satisfaction that in the Treaty of Peace a plan had been included for co-operation among the nations and the realization of peace and international security, approved the attitude of the Permanent Committee concerning relations with the League of Nations and expressed the desire that the most friendly and cordial co-operation may be maintained between the two institutions. Although no motion was passed on the point it was almost the unanimous sense of the Assembly that while co-operation with the League is, from all points of view, desirable, still the Institute should maintain its absolute autonomy.

The British Delegation in its own report while freely criticizing the details of the organization and activities of the Institute, expresses the view that the

experience of the war and the food prices have shed a very strong light upon the importance and even the necessity to all countries of some such organization as the Institute, that no one State is in the advantageous position in which the Institute stands, either as regards facilities for the collection of information or experience in handling it; that, as the discussions concerning the organization of a League of Nations have shown, if the International Institute did not exist it would now be necessary to create a body performing similar functions. The British Delegation urged that, difficult as the financial situation may be, Great Britain should not hang back but accept the obligation entailed in retaining the leading position she has always assumed in connection with the Institute. The British Delegates are persuaded that Great Britain will be fully repaid for her contribution by the use that will be made of the work done by the Institute.

Weeds

It is impossible to estimate even approximately the loss caused by weeds to Canadian agriculture. A bulletin recently published in the United States estimates the annual loss due to weeds in the country at more than \$300,000,000. Not long ago a western paper stated that the annual loss to farmers of Saskatchewan due to weeds was not less than \$25,000,000. If there is this loss in one province, the total in all Canada must be tremendous. There are many districts in the Dominion that stand high in weed production.

Weeds cause a direct, actual money loss such as those due to drought, hail or frost. There is also a loss in depreciation of property badly infested with weeds.

“Conservation.”

PART II

Provincial Government Departments

PROVINCIAL AGRICULTURAL LEGISLATION ONTARIO

The Agricultural Development Act, 1921.—This Act makes provision for loans to promote agricultural development as follows:—

- (a) For acquiring land for agricultural purposes;
- (b) For the erection of farm buildings essential to production;
- (c) To pay off charges existing against land at the time of acquisition by the borrower under a will or by descent.

The Act will be administered by a corporate body known as the Agricultural Development Board which may issue bonds and debentures guaranteed by the province; said bonds may be purchased by the province on the authorization of the Lieutenant-Governor in Council. Loans are to be secured by a first mortgage on agricultural land which may be supplemented by approved collateral. The amount loaned may be sixty-five per cent of the value of the security as shown by the valuator's report. Loans are repayable in equal annual instalments of principal and interest.

The Ontario Farm Loans Act, 1921.—Under the provisions of this Act incorporated associations may be formed for the purpose of making loans to the members for short terms of small amounts for current expenditures, as follows:—

- (a) Purchase of seed, feed, fertilizer and other supplies;
- (b) Purchase of implements and machinery;

- (c) Purchase of live stock;
- (d) Payment of cost of carrying on farming operations and for the cost of preparing land for cultivation. The interest charged is not to exceed seven per cent.

The goods purchased by the borrower are subject to lien and may be supplemented by such additional security as the directors deem necessary, including mortgages and assignments of real and personal property.

The provincial treasurer may loan money to an association for the purpose of assisting it to carry on its business, and the Minister of Agriculture may enter into agreements with banks and loan companies for securing money for the use of said associations.

The Agricultural Development Finance Act, 1921.—This Act empowers the provincial treasurer to borrow money and to employ the same for the following purposes, viz:—

- (a) Loans to members of associations under *The Ontario Farm Loans Act*;
- (b) Bonds or debentures issued under the *Agricultural Development Act*;
- (c) Bonds or debentures of or guaranteed by the Dominion or any province;
- (d) Bonds or debentures of or guaranteed by any municipality or school section of the province of Ontario.

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The Community Halls Amendment Act, 1921.—Provision is made for the establishment of community hall or athletic field in unorganized territory.

The Dairy Standards Amendment Act, 1921.—The amendment makes provision for the enforcement of the Dairy Standards Act and fixes the date upon which it shall come into operation as January 1, 1922. Provision is also made for a system of cheese factory and creamery inspection and stipu-

lates that the by-products of factory such as whey and skim-milk shall be pasteurized before being used for feeding purposes.

The Provincial Auctioneers License Act, 1921.—The Act provides that any person who in the opinion of the Minister of Agriculture possesses special qualifications may obtain a license on payment of the stipulated fee to sell pure-bred stock by auction in conjunction with local auctioneer.

AGRICULTURAL APPROPRIATIONS

	1921-22	1920-21
Civil Government.. . . .	\$ 123,000 00	\$ 95,072 01
Agricultural and Horticultural Societies.. . . .	186,254 00	185,363 75
Live Stock Branch.. . . .	92,571 00	73,500 00
Institutes.. . . .	30,800 00	31,026 95
Dairy Branch.. . . .	158,000 00	160,000 00
Fruit Branch.. . . .	81,600 00	76,984 85
Agricultural Representatives' Branch.. . . .	142,000 00	140,000 00
Ontario Veterinary College.. . . .	33,260 00	35,905 00
Miscellaneous.. . . .	195,514 02	252,841 16
Agricultural College.. . . .	566,845 02	458,501 00
Total.. . . .	\$1,609,844 04	\$1,509,194 72

AGRICULTURAL INSTRUCTION GRANT, 1921-22 (FEDERAL)

Agricultural Colleges and Schools

1. Ontario Agricultural College:	
Salaries and expenses, additions to staff, maintenance.. . . .	\$ 10,000 00
2. Agricultural School and Farm:	
(a) Capital expenditure.. . . .	\$73,000
(b) Administrative and teaching staff, maintenance, purchase of stock, machinery, repairs, services, expenses and equipment.. . . .	31,000
	<hr/> 104,000 00

Instruction and Demonstration

3. Agricultural Representatives.. . . .	135 000 00
4. Extension work in Household Science in rural communities.. . . .	1,303 26
5. Co-operation and markets, investigation of marketing conditions for Ontario crops, educational work in connection with the marketing of farm products, including organization of co-operative societies.. . . .	3,000 00
6. Demonstrations in connection with vegetable growing.. . . .	10,000 00
7. O. A. C. Short Courses for winners of Acre Profit and Live Stock Competitions including travelling and living expenses.. . . .	2,500 00
8. Women's Institute work, including courses in cooking, sewing, etc.. . . .	3,000 00
9. Short Courses for Fall Fair and Field Crop Judges, including travelling and living expenses.. . . .	5,000 00
10. Lectures on Horticulture.. . . .	500 00
11. Educational work in connection with growing and handling fruit.. . . .	3,000 00
12. Demonstrations with vegetables and hardy fruits in New Ontario.. . . .	6,000 00
13. Demonstration work on soils.. . . .	7,500 00
14. Bee-keeping.. . . .	1 000 00
15. Drainage work.. . . .	4,500 00

Elementary Agricultural Education

16. To provide for and to encourage the teaching of agriculture, manual training as applied to work on the farm, and domestic science in High, Public, Separate and Continuation Schools, and in Universities, to be available for grants, services, expenses and equipment and travelling and living expenses of teachers, inspectors and others in attendance at Short Courses or other educational gatherings, and to be paid out on the recommendation of the Department of Education.. . . .

40,000 00

\$336,303 26

QUEBEC

THE work of the last session of the Quebec Legislature in the interest of agriculture was considerable, and included three bills of major importance providing for (a) the establishment of demonstration farms; (b) the formation of intermediate agricultural schools; (c) the payment for milk and cream on the butter fat basis.

Establishment of Demonstration Farms

The essential clauses of Bill No. 29, regulating the establishment of Demonstration Farms read as follows:—

The Minister of Agriculture is authorized to establish demonstration farms, upon such conditions and for such terms as he may deem advisable, and, for the management thereof, to make contracts with such farmers as he may select upon the recommendation of his officers.

The Minister is likewise authorized to remunerate the owner of every such farm, and to advance him money, by way of a loan, with or without interest, for the purchase of stock and necessary equipment, and to pay for the construction of buildings, and every other expense incurred for demonstration purposes, out of the funds voted for the encouragement of agriculture generally, upon such conditions as may be set forth in the contract.

During the whole term of the contract, the operation of the farm shall be under the control of the Minister of Agriculture, and under such of his officers as he may select. Under the direction of the Minister the latter shall, among other

things, prescribe what methods of farming shall be followed; how the soil is to be worked; what system of rotation of crops it is expedient to adopt; what varieties of seed shall be selected and how they shall be treated; the drainage work to be done; the care and the kind of feed to be given to the live stock, and everything which will tend to add to the value of the farm.

No demonstration farm shall be liable, during the term of the contract, to any increase in municipal or school taxes, either general or special, for any amount which it has increased in value by reason of the improvements made to such farm.

Mr. L. P. Roy, head of the Field Husbandry Service, will have the management of the farms.

Intermediate Agricultural Schools

Bill No. 120 establishes intermediate agricultural schools and provides that: the Minister may establish and maintain in the Province a dairy school, under the name of the Dairy School of the Province of Quebec, and, at any place in the province, intermediate agricultural schools. Such schools shall be under his control and direction.

The Minister of Agriculture may purchase or lease land, and erect thereupon all buildings and additions required.

A sum of fifty thousand dollars shall be appropriated, out of the consolidated revenue fund, for the disbursements mentioned in this section.

The measure does not provide for the establishment of a new dairy school,

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but simply gives a legal status to that already in existence at St. Hyacinthe.

Payment for Milk by Test

The Bill to provide for the payment of milk and cream on the butter fat basis reads:—

Every factory must pay for all milk and cream received from its patrons, on the basis of its fat content as ascertained by the Babcock test.

Every factory which at present pays for milk or cream according to the fat content, must comply with the provisions of this section.

The test must be made in accordance with the instruction given at the dairy school of the Province of Quebec.

A sample of milk to be tested must be measured in pipette of a capacity of 17.6 cubic centimetres, and bearing the indelible stamp of the official inspector of weights and measures.

A sample of cream to be tested must weigh exactly nine or eighteen grammes, and be weighed in a Babcock bottle bearing the indelible stamp of the official inspector of weights and measures.

No one may take samples of milk or cream, nor test milk or cream, unless he be the holder of a certificate as expert tester from the dairy school of the province of Quebec.

The exact percentage of fat content shown by the test must be entered in a

register; and any person entering or causing to be entered any percentage of fat content which does not correspond with the result of the test, shall be guilty of an offence under this section.

No provision of this section shall apply to dairymen who carry on the business of selling milk for consumption in its natural state only.

Legislation concerning Bees

Apicultural legislation has been completed and simplified. One clause prohibits the importation of bees or of apicultural supplies without a certificate attesting that the bees are exempt from any disease and that the supplies are not infected. A second clause provides for the checking of contagious diseases of bees.

The enactments and amendments of minor importance were as follows:—

- (a) An amendment to the law of provincial competitions and of the provincial distinctions of agricultural merit;
- (b) A law concerning the protection of pure-bred animals;
- (c) An amendment modifying the law concerning agricultural societies;
- (d) An amendment to the law which governs the Society of Dairy Industry, the inspection of butter and cheese factories, and the manufacture of dairy products.

AGRICULTURAL APPROPRIATIONS

	1921-22	1920-21
Civil Government.....	\$ 52,116 66	\$ 49,183 33
Agricultural Societies.....	218,000 00	100,000 00
Farmers' Clubs.....	100,000 00	100,000 00
Encouragement of agriculture in general including Demonstration Farms.....	350,000 00	334,500 00
The Agricultural and Horticultural Society of Montreal.....	500 00	500 00
Pomological and Fruit Growing Society of the Province of Quebec.....	500 00	500 00
Council of Agriculture.....	3,000 00	3,000 00
Agricultural Schools.....	40,000 00	40,000 00
Veterinary Instruction.....	6,000 00	6,000 00
House-keeping Schools (Ecoles Menageres).....	32,000 00	18,000 00
Dairy Association of the Province of Quebec.....	2,000 00	2,000 00
Dairy School of St. Hyacinthe, working of farm and official Laboratory of the Province of Quebec.....	30,000 00	22,000 00
Dairy industry and inspection of factories for the manufacture of dairy products.....	145,000 00	130,000 00
Horticulture.....	25,000 00	15,000 00
Journal of Agriculture.....	27,000 00	27,000 00
Poultry Industry.....	15,000 00	15,000 00
Apiculture.....	6,000 00	6,000 00
Exhibitions.....	32,000 00	32,000 00
	\$ 1,084,116 66	\$ 899,183 33

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AGRICULTURAL INSTRUCTION GRANT, 1921-22 (FEDERAL)

Colleges and Schools of Agriculture

1. Grants and allowances:	
Macdonald College, School of Agriculture, Ste. Anne de la Pocatière, Oka Institute..	\$ 75,000 00
2. School of Veterinary Science, building and extension..	5,000 00

Instruction and Demonstration

3. Animal Husbandry..	9,000 00
4. Poultry Husbandry..	18,000 00
5. Horticulture..	35,000 00
6. Dairying, educational work in cheese and butter-making..	5,000 00
7. Agricultural Representatives..	69,000 00
8. Seed selection, clover plots and demonstrations..	9,000 00
9. Bee-keeping—educational work..	7,000 00
10. Drainage..	6 000 00
11. Maple Industry—Maintenance of schools and allowances to students..	4,000 00
12. Short Courses and Lectures..	9,113 76

Elementary Agricultural Education

13. To promote the teaching of Agriculture in Academies, Rural and Normal Schools, Teacher Training, School Gardens and School Children's Exhibits..	10,000 00
14. To promote the teaching of Domestic Science in Academies and Normal Schools—Grants, lectures and inspection..	10,000 00
	<u>\$271,113 76</u>

NEW BRUNSWICK

AGRICULTURAL APPROPRIATIONS

	1920-21	1921-22
	\$ cts.	\$ cts.
Grants to Agricultural Societies..	22,000 00	24,000 00
Brown-tail Moth Extermination..	764 83	
Butter and Cheese Factories..	5,500 00	5,000 00
Bonus to Mud Dredges..	1,000 00	1,000 00
Contingencies..	2,500 00	4,200 00
Departmental Salaries..	7,416 18	7,333 33
Departmental Travelling Expenses..	2,700 00	3,300 00
Encouragement of Horticulture..	1,500 00	1,700 00
Immigration..	10,000 00	
Miscellaneous and Insurance..	1,000 00	2,000 00
Encouragement of Poultry-raising..	3,000 00	3,000 00
Encouragement of Stock-raising and Dairying..	9,000 00	9,000 00
Standing Crop Competition and Seed Fairs..	5,200 00	5,200 00
Bonus to Wheat Mills..	5,000 00	2,500 00
Maritime Stock Breeders' Association..	800 00	800 00
Lime-rock Crusher and Power..	22,800 00	1,000 00
Exhibitions..	18,000 00	
Extermination of Insect Pests..		200 00
	<u>118,181 01</u>	<u>70,233 33</u>

AGRICULTURAL INSTRUCTION GRANT, 1921-22 (FEDERAL)

1. Agricultural Schools, Salaries and Maintenance..	\$ 1,600 00
2. Agricultural Representatives..	12,700 00
3. Bee-keeping..	3,500 00
4. Soils and Drainage..	6,500 00
5. Horticulture..	4,900 00
6. Short Courses..	800 00
7. Live Stock..	3,400 00
8. Dairying..	4,100 00
9. Poultry..	3,000 00
10. Entomology..	800 00
11. Agricultural Societies..	3,100 00
12. Women's Institutes..	7,700 00
13. Elementary Agricultural Education—Agricultural Instruction in Public, High, and Normal Schools, Household Science, Teacher Training, Grants and Allowances..	12,010 80
	<u>\$64,110 80</u>

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NOVA SCOTIA

ONLY two distinctively agricultural bills were passed at the 1921 session of the Nova Scotia Legislature and they were amendments to former Acts. The bill to amend the Dairyman's Act is, however, of importance. This bill, entitled, *An Act to amend the Act for the Encouragement of Dairying*, requires that on and after May 1, 1922, all cream delivered, sold or purchased at any creamery or cream station shall be graded as to quality, and payment shall be made upon the basis of grading.

In explanation of the foregoing it may be stated that at a number of creameries in Nova Scotia voluntary grading has been carried on for a period of years, but at the last meeting of the Nova Scotia Dairymen's Association a unanimous resolution was passed requiring that this grading be made compulsory at all creameries in the province.

The second bill of agricultural import was a further amendment to *The Sheep Protection Act*, making provision for the securing of compensation for sheep destroyed by dogs, the owners of which are not known, in the case of a farmer whose property lies within an incorporated town or village.

AGRICULTURAL APPROPRIATIONS

The estimates for Agriculture are set forth in the following table in comparison with the expenditure for the preceding year:

	Estimates 1920-21	Expenditures 1919-20
Agricultural Soci- eties.. . . .	\$ 20,000 00	\$ 19,694 38
General Agricultural College and Farm.. . . .	46,826 00	48,740 21
	48,000 00	52,709 75
	<u>\$114,826 00</u>	<u>\$121,144 38</u>

In explanation of the foregoing it may be stated that there were a few extraordinary expenditures for the year 1919-20 and that, to all intents and purposes, the estimates for the current year provide for the same expenditures as for the preceding year. It may be further added that as an offset to the foregoing expenditure there is an estimated revenue from the Agricultural College Farm of \$20,000.

AGRICULTURAL INSTRUCTION GRANT, 1921-22 (FEDERAL)

College of Agriculture

1. Science Building—Interest and Sinking Fund. \$ 8,000 00
2. Salaries and Maintenance. 23,000 00

Instruction and Demonstration

3. Agricultural Representatives.. 12 000 00
4. Short Courses.. . . . 1,000 00
5. Dairying.. . . . 6,000 00
6. Poultry.. . . . 1,500 00
7. Bee-keeping.. . . . 1,200 00
8. Drainage and Soil Survey. . . 1,000 00
9. Soils and Fertilizer.. . . . 1,000 00
10. Field Crops.. . . . 1,000 00
11. Fruit Growing.. . . . 1,000 00
12. Women's Work.. . . . 5,000 00
13. Entomological Work.. . . . 7,500 00

Elementary Agricultural Education

14. Agricultural Instruction in Public, High, and Normal Schools, Teacher Training, Grants and Allowances. . . 12,000 00
15. Contingencies.. . . . 516 69

\$81,716 69

EXTENSION WORK IN THE DEPARTMENT OF FIELD HUSBANDRY, UNIVERSITY OF ALBERTA

BY G. H. CUTLER, PROFESSOR OF FIELD HUSBANDRY

THE extension work in the department of Field Husbandry of the University of Alberta has been developed along four main lines:—

I. Testing of Varieties of all Farm Crops;

II. Distribution of Good Seed;

III. A Survey of the Native Forage Plants;

IV. Testing Suitable Methods of Crop Management.

The first two types of work are being met in a large measure through an organization known as the Alberta Crop Improvement Association. This association was formed by the department of Field Husbandry of the University. It brings the crop growers in immediate and constant touch with breeding and selection work that is being carried on for their benefit. Two services are thus offered, as follows:—

- (a) The co-operative testing and multiplication of new strains, new varieties and new hybrids produced by plant breeding and selection at the University;
- (b) The distribution of high grade seed, which in most cases is eligible for registration, from suitable varieties and strains of all farm crops.

I. Suitable crops and good seed are the basis of successful agriculture in any community. This is the more appreciated in a province like Alberta, where conditions of temperature, altitude, rainfall, etc., are so varied and extreme. By the Alberta Crop Improvement Association, whose membership has already far exceeded 2,000 farmers, extending from beyond Peace River Crossing in the North to Manyberries in the South, and Lloydminster in the East to Jasper in the West, suitable varieties of grains and forage crops are distributed for testing in all parts

of the Province. In 1919 over 1,500 samples of clover were sent out—the Sweet clover in the dry sections and the Altaswede, a new production by the department of Field Husbandry, in the more humid sections, as well as the irrigation sections. Alfalfa seed and a new variety of corn have been distributed. Two new varieties of peas, winter rye, barley, oats and wheat have also been widely distributed.

II. Twenty-five seed growing centres have also been developed as a special undertaking in the Association. Elite seed developed in the department of Field Husbandry, at the University, has been distributed in quantity to seed a minimum of one acre to each member. As a result one hundred and thirteen farmers, in groups of from 3 to 10, are growing seed eligible for registration. These seed growing centres cover nearly all parts of the province, wheat centres being developed in those areas where wheat growing is the more successful, and likewise oats, barley, corn and clover seed centres, where these are grown in greatest quantities. The following varieties are being extensively grown—Marquis wheat, Banner oats, Victory oats, Altaswede red clover, alfalfa (Grimm's), and Howes Alberta Flint corn. The corn is being multiplied more particularly in the South for grain, where the farmers have much hope of using it as a crop to substitute in part the bare fallow. The clover is being grown in the more humid parts and as well under irrigation conditions. Inspection is given the standing crop and threshed grain by members of the department of Field Husbandry and through an understanding with the Canadian Seed Growers' Association, registration is given to all seed that can qualify.

In order that the Registered Seed Growers and others interested may have

an opportunity of testing the quality of their seed with the best in the North American Continent, the department of Field Husbandry offers to assist in preparing and taking exhibits to the International Hay and Grain Show, held at Chicago at the time of the Live Stock Show. Exhibits are assembled at the University, and placed in suitable containers for shipment. Last season the exhibits were accompanied to Chicago by a member of the department of Field Husbandry and placed on exhibit in their proper place and class, for competition. Each was suitably labelled as being grown in Alberta. The result was that some 150 to 200 exhibits were made at Chicago. It will be remembered that Alberta oats and peas won grand champion positions in open competition, and her wheat obtained nearly 30 per cent of the prizes offered in Region 1. These successes have given a tremendous impetus to the cause of Registered Seed Growing in Alberta. This season the showings at Chicago should be considerably augmented. It should be pointed out that this feature of our Extension work is also being advanced under the Alberta Crop Improvement Association.

III. To help meet the urgent needs of stockmen, and in anticipation of greater developments in mixed farming in Alberta, a survey of the native forage plants was instituted by the department of Field Husbandry, in the winter of 1919 and 1920. The co-operation of the Boys' and Girls' Clubs and others interested, have been enlisted. The survey is under the direct supervision of Professor Newton, who is in charge of Forage Crop Investigations in the department of Field Husbandry. A circular was published and distributed pointing out the means by which grasses are identified and how all the grasses that are collected and sent into the University, will be identified and the sender advised as to their names. Professor Newton made excursions during the summer of 1920, in different sec-

tions of the Long Grass and Short Grass areas, and collected and identified in all, more than sixty different species of grasses. These are being kept in the department's Herbarium for future reference, and the most promising will be studied further in plot tests, for their suitability for hay and pasture.

IV. Very little has been undertaken by way of experiments in different methods of culture. In the spring of 1920, however, the Edmonton District Potato Growers' Association asked the department of Field Husbandry to study Potato Growing on several farms in the Edmonton and surrounding districts. So important were the results, that the organized potato growers not only expressed keen appreciation publicly, but unanimously passed a resolution requesting the University to continue this work.

The experiments were carried out on the farms of eight of the Associations' representatives. Each plot was distinguished from the others by some important difference, such as soil temperature, moisture, texture and fertility. The chief object in this experiment was to find a suitable variety of potatoes which the Edmonton District Potato Growers might safely adopt for co-operative marketing. The seed was supplied by the Association, but it was all assembled at the University, where it was treated and prepared for planting. The plots were then laid out and planted and observed regularly during the growing season for disease, and later dug and weighed by members of the department of Field Husbandry. A sample was then taken from each variety from each of the eight tests, and brought to the University, where cooking tests were made by the Household Science department. The results were compiled and published at the end of the season.

This season Stony Plain, another splendid potato growing district, has requested similar experiments and plans have thus been laid to considerably extend this important work. Additional

experiments in the best methods of potato culture, including the distribution, testing and multiplication of Certified Seed, are also being carried out this season. Very few of our growers have appreciated the prevalence of disease and the importance of the selection of seed as a means of controlling it. Certified seed, as produced under supervision last season, has been extensively advocated by the department of Field Husbandry during the winter, and seed

has been widely distributed for multiplication this season, that wide distribution of certified seed may be made among the growers next season. Registered seed is also being encouraged as an additional means of alleviating disease conditions and the maintenance of production.

In addition to the work outlined above, much assistance is given in judging standing field crops, seed exhibits at local fairs, and ploughing matches.

THE EXTENSION DEPARTMENT, UNIVERSITY OF SASKATCHEWAN COLLEGE OF AGRICULTURE

THE Extension Department of the University of Saskatchewan College of Agriculture serves the farming population chiefly through the Agricultural Societies. During the year under review many activities of different kinds were conducted by these societies, supervised and assisted by the Extension department. The number of these activities held during the year may be summarized as follows:—

Summer Exhibitions.. . . .	140
Ploughing Matches.. . . .	34
Standing Crop Competitions.. . . .	32
Summerfallow Competitions.. . . .	9
Seed Drilling Competitions.. . . .	4
Spring Stallion Shows.. . . .	6
Co-operative Live Stock Sales.. . . .	21
Calf and Colt Shows.. . . .	3
Poultry Shows.. . . .	26
Seed Fairs.. . . .	44

A large number of short courses were also conducted, some taking place at country points, and some being held at the college. During December, January, February and March, 45 Agricultural short courses, lasting two to three days, were held at country points. In all, 4,546 persons were reached in this way, or an average of over 100 people at each place of meeting. Two lecturers generally attended each of these courses.

Lectures on Seed Selection, Weed Control and kindred subjects were given

at all the Seed Fairs by the judges provided through the Extension department, and three or four thousand farmers and others interested were reached in this manner.

There were also three Agricultural Engineering short courses held at the College of Agriculture, each of three weeks' duration. Students enrolled for these courses totalled in all 105. In addition, six two-week courses in Agricultural Engineering were held at different centres in the country, where 156 students attended, or an average of 26 at each course.

Realizing the scarcity of efficient poultry judges in the province, a three-week Poultry Judges' short course was arranged for. Twenty-seven students attended this course, and ten successfully passed the examination. Evening lectures in poultry (one each Monday night for ten weeks) were also given during the winter in connection with the Extension department.

A limited amount of culling of poultry flocks was done last fall. In all, 196 flocks were culled, and approximately 14,000 birds were handled.

Short courses in Stock Judging for boys were conducted at 65 different

points, to train boys who were going to compete in the Stock Judging Competitions held at Regina and Saskatoon Summer Exhibitions. Not only boys who were to be in a team, but many others in each district attended these courses, and approximately 1,000 boys received expert instruction in this way. Two hundred and forty-five boys attended the Regina Farm Boys' Camp, and 175 boys went to Saskatoon. The competitions at these camps were supervised by the Extension department.

Besides meetings of a strictly agricultural type, the Extension department is often called upon to provide speakers for general educational topics for gatherings such as Teachers' Conventions, Community Rallies, Grain Growers' Conventions, etc. Last year 13 such meetings were supplied with speakers.

A Provincial Seed Fair also comes under the jurisdiction of the department. Last year there were 78 exhibitors, and 190 exhibits of grain. This was by far the largest provincial seed fair held in Saskatchewan.

SASKATCHEWAN AGRICULTURAL SOCIETIES' OUTLOOK FOR 1921

BY KENNETH GORDON, B.S.A. ASSISTANT DIRECTOR, EXTENSION SERVICE, UNIVERSITY OF SASKATCHEWAN

AGRICULTURAL Society activity in Saskatchewan started long before the province came into existence; the first societies were formed in 1884. The growth of Agricul-

tural Society work is shown by the following table, which gives the number of chartered societies in existence in 1905, the year the province of Saskatchewan came into being, and also the growth in numbers from 1910 to 1921.

Year	1905	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
No. of Chartered Societies.....	33	80	88	103	103	112	117	119	122	126	132	137	141

There are, as well, twelve energetic, though unchartered societies, doing good work but receiving no Government grants since they do not comply with the Agricultural Societies' Act with respect to distance from other active societies and general location.

The following table also indicates the growth in Agricultural Society activity during the years 1917, 1918, 1919. Details for 1920 have not as yet been tabulated. The figures for Regina and Saskatoon have purposely been omitted so as to give a better view of the actual condition of the average society:—

	1917	1918	1919
Average Receipts.....	\$2,971 34	\$3,033 82	\$3,341 15
“ Expenditure.....	2,772 60	2,981 84	3,146 03
“ Assets.....	1,951 44	2,267 05	2,341 39
Average amount of prizes.....	751 44	675 59	806 02
Societies having over 200 members	13	23	42

THE AGRICULTURAL GAZETTE OF CANADA

The general outline of the work to be followed this year will be similar to that carried on in previous years, but it is hoped that a larger number of societies will take part in the many activities that are suggested to them by the Extension department of the university and for which they are able to secure Government grants.

An amendment to the Agricultural Societies' Act states that there is now no maximum in the total grant that can be paid to agricultural societies on account of exhibitions.

The maximum grants earnable in connection with the minor activities still stands as follows:—

Spring Stallion Shows..	\$100
Bull Shows..	50
Colt and Calf Shows..	50
Seed Drilling Competitions.. . . .	50
Ploughing Matches..	50
Standing Crop Competitions for each of 5 crops..	50
Forage Crop Competitions..	75
Summer Fallow Competitions.. . . .	50
Good Farming Competitions.. . . .	100
Stock Judging Competitions.. . . .	20
Seed Fairs..	75
Horticultural Exhibitions..	100
Educational Meetings..	20

Through these grants the Government returns to agricultural societies who undertake any of these activities 50 per cent of the prize money actually paid out, up to the maximum stated above; except in the case of seed fairs, Standing Crop Competitions and Combined Seed Crop and Cleaned Seed Competitions, where two-thirds of the prize money expended is refunded. The grants for Standing Crop Competitions, Combined competitions, and seed fairs are paid by the Dominion Government the remainder being all provincial grants.

The Dominion Department of Agriculture through its Seed Branch has also suggested a new competition known as "The Combined Seed Crop and Cleaned Seed Competition." The maximum amount that can be earned by any agricultural society on account of this competition is \$200. This competition aims to encourage the production of approved seed of good quality and in com-

mercial quantities. Saskatchewan agricultural societies will be encouraged to undertake this excellent and progressive type of competition.

It would be impossible to describe in detail all the activities that societies may undertake this year, but we will say something about the use, and the educational benefits of some of the more important.

A certain number of spring stock shows have already been held this year. The advantage accruing from a spring show is, among other things, that farmers and breeders in the district can look over and judge for themselves the merits of the different male animals for service in their district; they can pick out the type that most nearly conforms to their ideal and are able to make early arrangements for their use. There are no doubt difficulties to overcome if a successful spring stock show is to be arranged, chief among which is the usually poor condition of the roads at this season of the year.

Ploughing matches are still popular but should be in the "activity list" of a larger number of societies, as good ploughing indicates more than anything else the character of the farming in the district; for is not ploughing the basic operation of all agriculture? Ploughing matches and seed drilling competitions are useful in developing, among other things, a pride in good workmanship which is too often overlooked in our present day rush and haste.

Standing crop competitions are also being encouraged as it is felt that a proper appreciation should be given to the results of careful work, in selecting and sowing grain, as shown by a good clean maturing crop in the field.

Since it is realized that sooner or later it will be necessary for Saskatchewan farmers to give up straight grain growing, and pay more attention to the production of forage crops, a competition in growing forage crops has been recommended to agricultural societies. The crops which a competitor may enter

in this competition are at present limited to the following: Sweet clover; Grimm alfalfa in rows; Brome grass; Western rye grass; Corn in rows for forage (this to be used as a substitute for summer fallow); Sunflowers in rows for silage.

The first four crops being either biennial or perennial could not be satisfactorily judged until the second year, so that in order to get the competition under way, agricultural societies have been advised to select either corn or sunflowers for competition this year. At the same time it is suggested that other crops should be chosen from amongst the first four mentioned and seeded this spring so as to be ready for competition next year. In this way it is hoped not only to develop an increasing interest and knowledge in the growing of forage crops, but also to discover the type of forage crop best suited to the various climatic conditions and districts in the province.

Twenty-one agricultural societies held co-operative sales of farm live stock, this spring. Where good animals were offered these sales proved successful, but there does not appear to be as yet, in some districts, a sufficient surplus of the best stock to be certain of having a very large number of buyers and good bidding.

The Summer Exhibition is probably the most important event conducted under the auspices of agricultural societies. This year there are arrangements already being made which indicate that last year's record of 140 shows will probably be broken. A large number of societies are offering special prizes to boys and girls who exhibit young stock and other farm produce, that has been grown, fed, and cared for by these junior exhibitors themselves. This kind of work is being encouraged, as it is felt that nothing is more important in rural life than keeping the boys and girls interested in the work of the farm and developing in them an appreciation of the best types of livestock. One of the

northern agricultural societies is offering very handsome prizes this year to boys and girls who exhibit calves, lambs, pigs, or chickens at their summer fair, that are owned and have been cared for by the exhibitors. One of the rules, is that the stock must have been sired by a pure bred animal.

A Fall and Winter Seed Fair is conducted by a very large number of societies. The number held in the province, however, generally depends largely on whether there has been a good crop season or not. During the past winter, forty-eight seed fairs were conducted and some very excellent grain exhibited and offered for sale.

Interest in poultry throughout the province is indicated by the large number of poultry shows held by agricultural societies and the innumerable requests from societies and individuals to have the poor birds, the non-producers, culled from their flocks. The difficulty that those interested in poultry are confronted with, is that the average farmer desires a good bird that will produce a large number of eggs, whereas the prizes at poultry shows are awarded practically altogether on the ability of a bird to conform to a standard of colour and shape. To overcome this, societies are being advised to offer prizes for "utility classes" awards to be granted on the estimated production of the birds.

During the winter months the Extension department of the university conducts two or three day short courses in Agriculture for any society desiring such lectures, and willing to advertise the meetings. It is hoped to further enlarge this very important educational work by improving the lectures by greater use of charts, lantern slides and the cinematograph. Besides these Agricultural courses, two-week Engineering courses are conducted by the Extension department of the University under the auspices of agricultural societies that can furnish sufficient accommodation for winter instruction in tractor and stationary engineering.

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Farm Boys' Camps are again being planned for this year at Regina and Saskatoon. Societies are asked to send teams of five boys between the ages of 14 and 17 years with an adult supervisor to the Regina and Saskatoon fairs where the different teams will compete in stock and grain judging, and weed identification. Scholarships are offered to the boys doing the best work in the different classes. The teams are the guests of the exhibition boards while at either fair, and the contests are conducted by the Extension department. Previous to the fairs, the Extension department sends an instructor to all agricultural societies who intend to enter a team, so that the boys that are selected and any others interested can get some preliminary instruction in judging. Through these camps about 1,500 boys have already been interested in better stock.

The farm girls are not to be forgotten, for a convention of farm girls between the ages of 15 and 21 years is being planned for this summer. The girls will be accommodated at the University residence, and will be given courses in Home Economics, Nursing and Community Leadership. Each Agricultural Society or Homemakers' Club

is invited to send a team of two girls, and the provincial Department of Agriculture will refund all railway fares in excess of \$7.

There are endless ways in which agricultural societies can serve, and are serving their communities. Their scope is limited only by the energy and resourcefulness of their directors.

There is a society in the south-eastern part of the province that is determined to get rid of all scrub sires of every class of live stock in the district. If this ideal would be undertaken and brought to a successful and accomplished reality by every society in Saskatchewan there would be hardly one scrub sire left in the province, for there are few districts that do not come under the influence of an agricultural society.

Another wide awake and enterprising society has undertaken community breeding in earnest. Shorthorn cattle and Berkshire swine are the breeds chosen. Nine choice sows have already been purchased; a superior two-year-old Shorthorn bull and six pure-bred heifers have also been acquired. Work of this kind can be done by any enterprising society and a reputation for a certain type of live stock can be established by a community.

THE FINANCIAL BENEFIT TO SASKATCHEWAN OF THE WORK OF THE PROVINCIAL DEPARTMENT OF AGRICULTURE

BY W. A. MACLEOD, EDITOR OF PUBLICATIONS

THE whole aim and purpose of the Department of Agriculture is to eliminate wasteful and unprofitable methods of production and to encourage permanently profitable lines of agriculture and the most economical methods of marketing farm crops. As the measure of success attained in carrying out this policy is dependent entirely upon

the measure of co-operation by individual farmers or farmers' organizations, it is impossible to give an accurate estimate in dollars and cents of the financial gain to the farmers of the province from the operations of the department.

There are a few lines of work the value of which it is possible to estimate more or less closely, but they are most of them

of a comparatively minor nature. The grasshopper campaign of last year is a notable exception.

Following on a less serious outbreak in 1919, this work was undertaken by the Field Crops Branch of the Department of Agriculture. With the co-operation of the municipalities concerned, excellent results were obtained, which effected large savings for the farmers first in the amount of crop saved and secondly by supplying the necessary materials at wholesale rates. The total supplies furnished to municipalities for the whole season amounted to 2,720 tons of bran, 225 tons of sawdust, 112,636 gallons of molasses, 2,805 cases of lemons, 166 tons of arsenic, 34 tons of Paris green; the total cost, including incoming and outgoing freight and express charges, amounting to \$337,820. These supplies were bought in large quantities at wholesale prices and sold at half cost to the municipalities, which meant a very large initial saving.

A questionnaire sent to the secretaries of the municipalities affected elicited replies showing crop saving which at first glance seems incredible, namely, 1,400,000 acres, although almost one-third of all Saskatchewan municipalities were concerned. This acreage saved would be about a tenth of the total acreage of the province. The money value of the crop saved, after making all allowances for light yields, destruction by hail, drought loss, etc., has been estimated at well over \$25,000,000, in this one year alone.

It is expected that another campaign will be necessary this year, and the department has found by experiment that a very much larger proportion of sawdust can be used in the poison bait without lowering its efficiency, so that in this way a further saving has been made possible.

The Live Stock Branch is a big money maker for the farmers. By its credit system it enables many breeders who would not otherwise have done so to obtain pure bred bulls. By refusal of

a license to undesirable stallions, not only is the horse industry benefited, but the value of the good sires enrolled is increased. Large numbers of breeding cattle were saved from the abattoir by the heavy purchasing of the branch during the drought years for resale to other farmers who had plenty of feed. By supplying blackleg and hemorrhagic septicemia vaccines and syringes at cost, veterinarians and stockmen were saved from eight to thirteen cents per dose according to the variety of vaccine, and nearly 120,000 doses were supplied approximately at cost in 1920 alone.

The Co-operation and Markets Branch, since it began operations in 1914, by fostering co-operative selling and purchasing has rendered an immense service to Saskatchewan agriculture. This can best be indicated by the steady success of the co-operative organizations, and the increase in their numbers. Their total turnover has increased, in round numbers from \$281,000 in 1914 to \$6,190,000 in the year ended April 30, 1920.

The outstanding success of the Dairy Branch is the establishment of standard grading both of cream and butter. This has resulted, coincident with a great increase in quantity, in a very marked improvement in quality, and the opening up of new markets, in which Saskatchewan dairy products formerly could not compete.

The value of the guidance and information given out each year by the department is inestimable. As an illustration of the extent of this side of the work it may be mentioned that last year 73,000 bulletins were supplied, all on request, and this is quite aside from the information given by correspondence. Another service which the department is rendering must be mentioned. It has acted as an intermediary between many farmers and their creditors, and in this way has succeeded in keeping many a good farmer, in difficulties through no fault of his own, upon the land, who would otherwise inevitably have gone out.

THE POULTRY HUSBANDRY DEPARTMENT OF THE MANITOBA AGRICULTURAL COLLEGE

BY M. C. HERNER, PROFESSOR OF POULTRY HUSBANDRY

THE Poultry department of the Manitoba Agricultural College was established in the fall of 1911. There are three branches of work carried on:—

- (a) Operation of the poultry plant.
- (b) Teaching work, and
- (c) Extension work.

Probably the most extensive branch of the work on the poultry plant is that of breeding and selection for heavy egg production. Under this heading falls the greater part of the work of the poultry plant. All other work in some way or other hinges on, or links up with this. Nine year's work has given us much light on how egg producing capacity is transmitted to the off-spring. We have made fairly good progress year after year until this past year our best pen of 25 white leghorn hens averaged just a fraction less than 205 eggs for the year as against an average of 139 eggs from the 25 best seven years ago. A pen of 20 Barred Rocks averaged nearly 200 eggs for the year as against 157 for the 20 best last year. This year a Barred Rock heads the list again with 261 eggs to her credit and a White Leghorn second with 246 eggs. Hundreds of eggs for hatching, baby chicks, and breeding stock of this same line of breeding as these birds have been sent out from year to year. We cannot lay too much emphasis on the value of this work, and the effect it is likely to have on the poultry industry in the West.

Much of the experience gained and information gathered in this work we have been able to put to good use in culling farm flocks. In addition, this material is of the greatest value in our lecture courses and class-room work with the students.

Electric Lighting

For the past three winters we have carried on experiments on electric lighting, and the results obtained clearly show certain distinct advantages. For winter egg production the use of electric light is a paying proposition. The three winters' work with White Leghorn and Barred Rocks clearly shows that the use of electric light is limited to the months of October, November, December, January and February, but that the birds under light lay so many more eggs for which higher prices are received that the total eggs and the total revenue for the year from the no light birds can never reach that of the lighted pens.

Grading up a Farm Flock of Mongrels

In the fall of 1917 grading work was started with 100 mongrel pullets. These were mated with Barred Rock males and the chickens hatched from them were used for the experiment the second year. These were then mated again with Barred Rock males, and their chickens are being used for next year's experiment. The experiment will cover a period of five years. The object is to show what the farmer can do in the way of getting more eggs by using pure bred males.

Egg Production as Affected by Climate

For a long time we have contended that it is almost impossible to get as heavy egg production in our climate as in Ontario or in the United States. Or in other words, our contention has been that a hen laying 150 eggs in this climate

would likely have laid close to 200 in the east or south. Or again, that 200 eggs per hen was just about as good here as 250 in these other climates.

In order to find out whether this contention was right or wrong, this department is co-operating with the Poultry Department of the North Carolina Agricultural College at West Raleigh, in the matter. In August, 1919, we sent them 25 White Leghorn pullets of our heavy laying strain. We also reserved 25 pullets of the same age, breeding and weight for our pen here. Both pens are fed exactly alike; the climate is the only difference. The following table gives the egg production of each flock month by month for the entire year.

Table on Egg Production in Co-operative Experiment

Egg Production for each month of the year beginning November 1, 1919, and ending November 1, 1920.

Month	In Manitoba	In North Carolina
November, 1919. . . .	232	150
December, 1919. . . .	91	209
January, 1920. . . .	131	145
February.	205	207
March.	366	357
April.	345	435
May.	399	462
June.	320	381
July.	155	383
August.	212	309
September.	77	119
October.	4	13
	<hr/> 2,537 <hr/>	<hr/> 3,170 <hr/>

The difference in favour of North Carolina climate was 633 eggs or an average of 25.3 eggs per hen more than in Manitoba.

From observations we have made in this co-operative experiment we are inclined to think that it will lead to quite an elaborate system of co-operative experimental work between the poultry departments of the different agricultural colleges, and bring about a good deal closer co-operation than has existed heretofore.

Cost of Producing Eggs in Different Breeds

This line of work is now in its third year. The four breeds used are Barred Rocks, White Wyandottes, Rhode Island Reds and Buff Orpingtons. The first year two pens of 20 pullets each in each breed were used, and the past two years the twenty best as yearling hens were put in one pen and 20 pullets of each breed in the other pen. So in addition to getting the cost of producing eggs in each breed, we also get the difference in the cost of producing eggs from pullets as compared with hens of the same breed. This work is planned to go over a period of five years.

Many other smaller lines of investigation work arising out of these larger ones are being conducted. Every hen on the plant is trap nested. Egg records, feed records and mortality records are kept of all pens. Records are also kept of all eggs set, their fertility, hatching and mortality in the chicks hatched. Broiler and roaster production is conducted on a large scale and data on cost of production are being gathered each year.

Teaching and Teaching Material

With the steady progress made in our breeding and selecting for heavy egg production work, and the data we have on feeding, rearing, incubation and so on, we have been able to get an abundance of material of the right kind for teaching work. The variety of breeds kept, their quality and breeding, has also given us a chance to teach the judging of poultry and the selecting of layers in a way to give the students the training they need.

Besides the regular teaching work this department is conducting a correspondence course of 25 lessons. In addition, the staff are holding a poultry night school in the city each winter.

Extension

Ever since the department has been established we have been called upon to investigate disease, give measures of prevention, control and eradication in hundreds of instances each year. Large numbers of diseased specimens and parts of specimens are sent in each year and many special investigation trips are also made.

The outside lecturing and demonstration work with Poultry Associations and Agricultural Societies is quite heavy. Judging at Poultry and Agricultural Shows, also Boys' and Girls' Club Fairs requires about six weeks' time each year.

The last two years we have culled quite a number of farm flocks with very good results. In almost every case the egg yield was not decreased in any way at all by taking out one-half of the birds in the flock. In many flocks the egg pro-

duction was increased even after culling out one-half of the flock as poor layers.

Most of this work is carried on through a series of poultry bulletins, circulars and posters. Fourteen of these are available now, comprising material on almost every phase of poultry work. The department also puts up an exhibit each year at three or four of the leading shows in the province. Quite a number of timely articles go out from the department from time to time as the demands arise.

Thousands of eggs for hatching, baby chicks and breeding stock are sent out each year. The farmers and poultry men get linked up closely with the department in this way. Besides improving his flock by the introduction of a better class of bird, he also makes full use of the service the department endeavours to give in the way of information and advice on all phases of poultry work.

SEED POTATO CERTIFICATION IN BRITISH COLUMBIA

BY C. TICE, B.S.A., OFFICER IN CHARGE

BETTER seed potatoes and the standardization of varieties are considered to be the most important requirements in connection with the improvement of the British Columbia potato industry.

In order to assist in the production of better seed potatoes, the Soil and Crop division of the provincial Department of Agriculture has inaugurated a system of seed potato inspection and certification.

Statistics show that British Columbia produces on an average 6.1 tons of potatoes to the acre, a yield which is higher than that of any other province or state in the North American continent. This high average yield can for no reason be attributed to the use of

superior seed or to better cultural methods, but rather to the favourable conditions for potato growing. First, the Colorado potato beetle which is such a pest in many parts, although it has been introduced, does not exist in the potato-growing districts; second, the climate is an ideal one for potatoes, namely, hot days followed by cool nights; third, Leaf Roll and Mosaic diseases, which reduce the yield considerably in other parts, are very little in evidence here; fourth, Late Blight is confined to a few distinct areas; fifth, much of the land is new.

of the potatoes after harvest, but that

It has only recently been recognized that the very best seed potatoes cannot be obtained merely by an examination

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inspection of the potato plants at various stages of growth is essential, since certain diseases can be detected only by vetches mixture, and sunflowers for cases are more readily diagnosed. For this reason certified seed potato production has been commenced in British Columbia.

The definition given to the term "certified seed potatoes" in this province is: certified seed potatoes are potatoes which have been inspected by trained officials of the Department of Agriculture, twice in the growing crop and once after harvest, and found to conform to certain definite standards adopted by the certifying agency. The standards referred to are similar to those used in the United States and were compiled by the Soil and Crop division, with the assistance of Mr. J. W. Eastham, Provincial Plant Pathologist, and afterwards submitted to various provincial and Dominion authorities.

Two inspections of the growing crop are deemed necessary; the first at bloom-time and the second just prior to maturity. A further inspection of the crop is made after harvest. By this method the inspection is thorough, and the chances of overlooking any diseases are greatly reduced.

Before any potatoes can be passed as certified seed it is essential that they be carefully graded. Growers whose potatoes pass all inspections will receive a certificate after the final inspection. This certificate certifies that the seed potatoes have been inspected by an official of the Department of Agriculture, and have been found to conform to the required standard as regards purity of variety, type, and freedom from disease. At the time of sale the grower receives a tag for each sack of potatoes passed as certified seed. This tag will be attached and sealed by the inspector, or some other duly authorized person, and will bear the name and address of the grower, the size of

seed and the year in which the potatoes were grown.

Since the climatic conditions of the province vary greatly, it is impossible to standardize potato varieties as closely as is done in other provinces. For this reason the following varieties will be eligible for inspection: Green Mountain, Irish Cobbler (Extra Early Eureka), Gold Coin, Jersey Royal, Jones' White, Empire State, Early St. George, Early Rose, Early Epicure, Early White Prize (Surprise), Netted Gem, Burbank, Up-to-date, Sir Walter Raleigh, Eureka, and Carman No. 1.

During the winter months a great deal of propaganda was undertaken in connection with this work, lectures on certified seed potato production and potato growing being held in a large number of districts. The lectures on potato growing were illustrated with slides covering cultural methods, diseases and their treatment, and spraying.

Through the co-operation of the Dominion Fruit branch in this province, Mr. Grant, Markets Commissioner, and the Soil and Crop division, it has been possible to form several potato associations. The certified seed potato work is as far as possible being carried on in conjunction with these associations. It is encouraging to be able to state that in the Ellison district, near Kelowna, some fifteen or sixteen farmers will plant a total of approximately 35 acres, using as foundation stock imported, certified seed of Irish Cobbler, Green Mountain and Netted Gem varieties.

In the Comox district on Vancouver Island twenty farmers intend growing certified seed of the Up-to-Date and Burbank varieties. Other districts taking up this work are Chilliwack, Sooke, Keatings, and Salt Spring Island.

Intending growers of certified seed potatoes must obtain an application form for inspection before June 15 of the year in which the inspection is re-

quired. This form bears the name and address of the grower, the name of the variety, the history and source of seed, date of planting, previous three years' cropping of the field, and a serial number.

Such a system of seed potato inspection and certification as outlined will

be the means of increasing the yield per acre, and will greatly assist in improving the quality of the potatoes. Besides this, the public will be able to obtain reliable potatoes for seed rather than be forced to accept the culls from table stock, as is now so often the case.

DEMONSTRATION APIARIES IN BRITISH COLUMBIA

A SERIES of demonstration apiaries will be established immediately by the provincial department of agriculture on the lower mainland, to be in charge of government inspectors.

These apiaries, consisting of three hives of bees, will be located at McKay, New Westminster, Sullivan, Whonnock, Mission, Abbotsford, Sardis, Agassiz, Chilliwack, Bradner and Huntingdon, where bee-keepers have expressed their willingness to comply with the regulations.

The inspectors will take complete

charge of the bees for the season and give the public instruction and demonstrations at each visit. The owner must supply all requirements in modern equipment, supplies and new queens. In return he will have the benefit of expert advice and the whole of the honey that is obtained during the management.

The proposed scheme meets with much favour among bee men as it will determine the honey possibilities of each district when the bees are managed under modern methods.

LIVE STOCK IMPROVEMENT, SASKATCHEWAN

"IT WILL be agreed on all sides that the conspicuous lack of quality in our livestock, which is causing tremendous loss every year to the livestock industry, is due in the main to the inferiority of the average herd sire," states the Saskatchewan Livestock Commissioner, Mr. J. C. Robertson. "The slow rate of progress in herd improvement is attributable partly to the fact that a large number of farmers and stockmen do not seem to be aware of how rapidly a marked improvement can be

brought about by the use of a pure-bred sire of good type, and partly because it does not seem to be sufficiently widely known that there need not be any financial obstacle in the way of procuring a good bull, owing to the policy of the Saskatchewan Livestock branch in selling pure-bred sires on easy credit terms, and of the Dominion Livestock branch in loaning bulls.

The 'Better Bull' campaign now being conducted by the Livestock branch of the provincial Department of Agri-

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culture will endeavour to bring the essential facts home to the farmers and stockmen of the province, and an educational campaign will be conducted by means of monthly bulletins in all banks, by the issue of circulars and articles in the press. The matter will be laid before the audiences at all stops of the Better Farming Train, and the arguments in favour of the pure-bred sire will thus be brought to the attention of several thousand stockmen. In addition, circulars are to be forwarded to banks, secretaries of municipalities and the owners of scrub sires, giving a list of farmers who have pure bred bulls for sale or exchange, and a survey of several districts in the province will be

made in order to ascertain the percentage of pure-bred sires kept and the quality of same.

At ten or twelve of the largest Exhibitions an exhibit will be made this summer to illustrate the various classifications of butcher steers, and also an exhibit of pure-bred, grade and scrub sires. A moving picture film showing the necessity of using good pure-bred sires is now being produced, and will doubtless be of great assistance. Throughout the whole campaign the branch will seek to obtain from practical farmers all possible information that is likely to prove of assistance in this important work.

MOTION PICTURE BRANCH, SASKATCHEWAN

THE educational value of motion pictures has long been recognized, but until recently no systematic effort has been made to prepare films of an educational nature, dealing directly with Saskatchewan problems. A motion picture branch of the provincial Department of Agriculture has recently been established which will have charge of the work of planning and

photographing educational pictures in that province.

The films exhibited by the department during the first three months of this year were seen by over 15,000 persons. An extensive programme of pictures is planned for this summer, and it is expected that a large number of agricultural societies and schools will make use of them.

NOVA SCOTIA SHORT COURSES

FOUR very successful Short Courses were conducted by the staff of the Nova Scotia Department of Agriculture, assisted by members of the Dominion Department staff, during the last two weeks of March. These were held at the following points: One at Lawrencetown, Annapolis county, extending over four days; one at Yarmouth, two days; one at Musquodobit,

Halifax county, three days; one at Stewiacke, Colchester county, three days.

The average attendance at all classes of the four courses was considerably over one hundred, the total attendance at all four running up to about a thousand persons.

All these courses were conducted in buildings which were erected or re-

modelled with a special view to providing facilities for the work. Under the provisions of the Dominion Agricultural Instruction Act, grants were made to assist communities in securing such premises.

A specially attractive feature at all these short courses this year was the use of the motion picture to illustrate

such subjects as the growing of turnips, growing of the oats, peas, and vetches mixtures, and sunflowers for silage purposes, marketing of wool, grading of cream, cow-testing, strawberry culture, growing of celery, hatching and feeding of chickens, potato growing, spraying and dusting of fruit trees, potatoes, etc.

UNIVERSITY EXTENSION IN NOVA SCOTIA

The People's School conducted by St. Francis Xavier University at Antigonish

A NOTABLE and highly successful experiment in extension work was undertaken last spring by St. Francis Xavier University, at Antigonish, Nova Scotia, under the direction of the Vice President, Rev. J. J. Tompkins and his staff. Dr. Tompkins and his associates in the college believed that the institution might help to solve by educational means the three great problems confronting the rural population in particular, namely, better farming, better business methods and better living. This led to the inauguration of free classes available to young people who had left school in their early teens without having secured more than the rudiments of an education. The only qualification demanded was a desire to learn. The classes, which extended from the beginning of January to the end of February, soon demonstrated the correctness of judgment of those who had inaugurated the movement, which was that there were many young men and women to whom such an opportunity would appeal and who would avail themselves of it. It further demonstrated that an unexpected degree of native talent existed among those in attendance, talent which ought in the interest of the country and the individual to be more fully developed. Of the fifty students taking

the course, varying in age from 16 to 57 years, very few had attended school after the sixth grade.

The subjects taken up included agriculture, veterinary hygiene, English, commerce, commercial law, arithmetic, mechanics, history, political economy. The College professors, who undertook the work voluntarily, received valuable practical assistance from leading business men and farmers.

The agricultural course was as follows:—

Agriculture:

- (1) Stock Breeding: (2 hours a week. Rev. M. N. Tompkins, B.S.A.)

Importance of Live Stock: Types of Farm Animals; the Art of Breeding—Producing Animals of the Required Type.—Cattle, Horses, Sheep, Swine, and Poultry. Principal Breeds, and Outstanding Qualities.

- (2) Feeding Farm Animals: (3 hours a week. Rev. Dr. Hugh MacPherson).

Nutrition, Food Values; Analysis of Farm-Grown Crops and Mill Feeds; Feeding of Young Stock; Feeding for Production; Feeding of Various Classes of Farm Animals considered in detail.

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- (3) Soils and Crops: (8 hours a week. Rev. Dr. Hugh MacPherson) Origin of Soils; Types of Soil, with special reference to soils in Eastern Nova Scotia; Factors and Conditions that constitute the fertility of the soil; Treatment of Soils, Drainage, Cultivation, Rotation, etc. Importance of good seed in crop raising; Seed Selection; Preparation of the ground for the seed; Special Features in Crop Raising such as Spraying, etc.
- (4) Veterinary Hygiene: (1 period a week. D. A. MacIsaac, V.S., B.V.Sc.) Sanitary Care of Stock; Ventilation; Water Supply; Milk and Meat Sanitation; First Aid in Sickness; Types, Management and Care of Breeding Animals.
- (5) Biology and our Natural Resources: (1 hour a week. Rev. Dr. C. J. Connolly).
- A Series of Lectures on the Relation of the Science of Biology to the Development and Conservation of Natural Resources.

In view of numerous predictions of failure, the success attending the course proved particularly gratifying. "It was said," states Dr. Tompkins, "that nobody would come, that they would not stay when they did come, that they would not learn, could not be classified, etc." The very opposite was the truth. The men had also a profound effect on the University—both professors and students to whom visions of increased usefulness were opened up. "We never in our history did anything so worth while as the establishment of the People's School."

Many who attended have since written expressing their appreciation, and their desire to return another year to take up advanced courses. The Secretary for Agriculture and Principal of the Nova Scotia Agricultural College, Dr. M. Cumming, believes that the school is of a type that should be permanently established. In view of the popular interest and the success of the first school, the question is not so much that of continuing it but of providing sufficient accommodation for those who desire to attend.

"Die when I may, I want it said of me by those who knew me best that I always plucked a thistle and planted a flower where I thought a flower would grow."—Abraham Lincoln.

PART III

School Agriculture and Related Activities

AGRICULTURE FOR PUBLIC AND HIGH SCHOOLS

BY J. B. REYNOLDS, M.A., PRESIDENT, ONTARIO AGRICULTURAL COLLEGE

A TEACHER in a village school who had heard rumours about agriculture as a subject to be taught in the public schools, announced to her class in June that she would teach agriculture when the school opened in September. During the holidays she took the precaution to prime herself with a summer course at the O.A.C. We shall not take time to inquire what or how much she learned there in five weeks. When the school opened in September, she commenced cheerfully and optimistically by asking each member of her class to write out a question or two that might form the basis of their studies and their inquiries. Ten notes from the ten members of her class were laid on her table next day. She found herself confronted with the following programme:—

1. How to plan and work a vegetable garden;
2. How to run a poultry house;
3. How to get rid of couch grass;
4. How to prune apple trees;
5. Bee-keeping for profit;
6. How to weed out poor cows from a dairy herd;
7. How to produce registered seed;
8. What is a good crop rotation for our farm;
9. How to feed a calf for the School Fair;
10. What is the best variety of corn for silage, and how should it be planted and cultivated?
11. What are legumes, and what effect have they on the soil?

There were more questions, for some of the notes contained several, but these were enough to reveal to the teacher the appalling nature of her undertaking. It is quite possible that these questions were prompted, not so much by the pupils' curiosity or passion for 'knowledge of this practical kind, as by their very natural desire to "stick" the teacher. She wished she had thought to ask for these questions before taking the five weeks' course at the O.A.C. She began then and there to see for the first time, with some clearness, that agriculture is an exacting and comprehensive business altogether. She decided that if any one of the farmers in that district knew the answers to one-half of these questions, she would appoint him chief assistant and specialist in agriculture for that school.

If one is to teach agriculture with any satisfaction one must know what it is, whether a trade, an art, or a science, or all three put together; and if all three, which of the three comes within the scope and ability of the teacher to impart; and which of the three meets the needs of the class; and what and how much of all that is included in agriculture can be properly taught in the school.

Some consider agriculture a trade. According to the dictionary, a trade is a skilled or special handicraft. If we think a moment, we shall see that agriculture is not one trade, but a group of trades, and that the "handicraft" part of the business of farming is perhaps

the least important. To be a successful farmer, one may need to be able to handle a hoe, a fork, a scythe, a spade, and a hammer; to milk cows, to sharpen mower and reaper knives, to splice a rope, to train a colt; to drive and to repair machinery. A farmer may be an expert handicraftsman in any one of these trades, but he is not likely to be expert in them all, and he may be a good and successful farmer without being expert in any one of them. Evidently then, agriculture is something more than a trade or group of trades, and teaching agriculture may, or may not, include any or all of such handicrafts.

Some consider agriculture an art; which again is defined by the dictionary to mean "a branch of learning to be studied in order to be applied"; or "the practical application of knowledge or natural ability," and the general definition of agriculture is given as follows:

"Agriculture is the generic term, including at once the science, the art, and the process of supplying human wants by raising the products of the soil, and by the associated industries; farming is the practice of agriculture as a business; there may be theoretical agriculture, but not theoretical farming; we speak of the science of agriculture, the business of farming; scientific agriculture may be wholly in books; scientific farming is practiced on the land: we say an agricultural college, rather than a college of farming."

Our schools must teach what they are equipped to teach. They are not equipped to teach the business of farming, for they will have no farms or farm equipment; nor is the teacher supposed to be a practical farmer, and competent to advise and direct in the details of the business of farming. Our schools may teach the science of agriculture, or rather may teach some few branches of that science, as time may allow, or as the interest and capacity of the teacher may

enable. It is important to realize that in any event, a selection must be made.

One more distinction in order to clear the way, namely, the distinction of "scientific" from "technical" as applied to agriculture. The distinction may be illustrated by asking a question or two: Shall we teach botany or study the habits of weeds with a view to control or eradication? Shall we teach hydromechanics or study the structure of soils and the movement of soil water? Shall we teach chemistry or soil fertility? Shall we teach zoology or economic entomology and poultry and animal husbandry? In brief, shall the education given be scientific or technical? Again to quote the dictionary:—

"Technical education means that those who are engaged in industry should have a trained intelligence and understanding of the special industries which they enter as bread-winners."

We have, then, four branches of agriculture any one of which may be taught in the public and high schools:

1. The trade or handicraft, in using tools and machinery; such as, the proper use of a hoe or a rake, a plough or a reaper.

2. The application of knowledge to practical problems such as gardening, feeding calves, pruning trees, candling eggs, milk testing, and growing improved seed; or, the art of agriculture.

3. The direction of school studies for economic or vocational purposes, such as Economic Botany and Entomology, Agricultural Chemistry, Soil Physics, and Farm Mechanics; or technical education.

4. Elementary science, which may afterwards serve as introduction to economic application.

A fifth may be added, usually called Nature Study; consisting of a series of observations on natural objects and natural phenomena, such as birds, trees, flowers, rocks, and clouds; the purpose

being partly economic and mainly esthetic.

Here then is an outline of the curriculum possible, and from its variety and extent it must be taken on the plan of options. You pay your money and you take your choice, or rather, you take your choice and then take the money.

These four options, or five if we include Nature Study, to some extent interlock and overlap. Whichever of the options is followed as a practicable school course, some of the other options will necessarily be involved. Nature study may involve some gardening, and technical education does require as a prerequisite some elementary pure science.

What is to decide the option chosen? Not properly, I venture to say, the interests and likings of the teacher. If the teacher has an option, it will be within the option itself, but the course followed is thrust upon the teacher by the logic of circumstances.

It may be known to those who are teaching what is called agriculture in the public and high schools that so far as the parents of the children who came from the farms are concerned, many of them object to the teaching of agriculture as a vocational subject. These parents wish their children to enjoy the same advantages in general education as children in towns enjoy. They object to the assumption that because their children are born on a farm, they must necessarily choose farming and country life as their lot. They insist that their children must be left free to choose other vocations as their abilities or inclinations may prompt. These parents claim that if agriculture is to be taught either as a vocational or as a cultural subject, it should be taught in the town schools as well as in the rural schools, and that applies particularly to the work in public schools.

This objection is offered, as has been said, by parents of children in rural schools. It has been offered also by many who are engaged in agricultural

education, and by some who have received their education at an agricultural college. As for example, an O.A.C. Alumni Association objection is taken also to the term agriculture so applied to a subject of instruction in the public schools of the country. The term, it is claimed, is too suggestive of vocational training merely, and moreover, when interpreted in its vocational sense or even in its technical sense also, the term agriculture does not include enough. Besides the problems of production which agriculture strictly refers to, there are allied questions of equal importance which should be made subjects of instruction: questions of distribution and marketing; of the relations of agriculture to other industries and to the national life; of co-operation and community organization and social life in the country. Therefore it has been suggested that the phrase "rural science" should be substituted for the term "agriculture" in describing this subject. There is some objection also to the phrase "rural science," as being both too vague and too ambitious, but we shall let it stand for the present.

If rural science is to be taught in the public and high schools, it should be made to serve the educational purposes that any subject of instruction should serve. Those purposes are, in order of importance: to develop personal power, to cultivate the sense and understanding of social and moral obligations, and to prepare for a vocation. The point to be emphasized here is, rural science is degraded in value and importance if it is treated merely as a vocational subject made to serve only the last and least important educationally of the three purposes mentioned. It is claimed by those who intelligently advocate rural science as a subject of instruction in the lower and secondary schools, that it offers abundant material for developing personal power and for cultivating the sense of social and moral obligation, as well as for vocational training.

Personal power is developed through discipline; by training the powers of observation and of judgment. The materials of study should be exact and concise, not vague and loose. This quality of exactness and conciseness is secured in the sciences, biology, chemistry, physics and mathematics that are associated with agriculture. And in the applications of these sciences to the technical work of agriculture, the same exactness and thoroughness are required. Candling eggs ought not to be entrusted to anyone who is not trained and entirely careful and honest. It is impossible to get results from an incubator without exactness, punctuality, and perseverance, as well as an intelligent observance of rules and conditions.

A professor of poultry husbandry declares that a man of twenty whose interest has been awakened and who has had a year's training in looking after a flock of poultry will set a pace that no unskilled labourer can keep up with; he will look after fifty per cent more hens and get better average results than the labourer. That is personal power gained through discipline and the awakening of the mind. Milk-testing is based upon exact science but must be accurate in observing and in calculating. Feeding and managing live stock may be and too often is a slipshod, haphazard business. But with a knowledge of chemistry, physiology, and animal psychology, the carefulness and exactness of observation and of judgment that are developed in these sciences are carried over in the technical applications.

Under the topic of science proper, I wish to emphasize that the only distinction, if any, between the regular school science and agricultural science should be the material selected. The scientific method should be followed in one as well as in the other, and if it is so followed the educational result will be identical in both. If it is desired to

push the economic aspect of the study of, say, couch grass, beyond the study of its stem and root, then the class may find the relation between the botany of the stem and root structure and the methods the farmer has to use to get rid of couch grass. But always, if we wish to keep the science uppermost, we must continue to ask the question why. The teacher and the class may find out the "how" of farm practice from good farmers, and then discover the "why" from the science student in the school.

The phrase "rural science" may include topics of economic, social, and civic interest; types of farming; proportion of owners and renters; markets and transportation; rural utilities; the economic relation of farming and country life with national commerce and national industry; laws relating to agriculture; and rural organization,—the school, the church, co-operation in all its forms, farmers' clubs, women's institutes, rural credit societies.

These economic, social and civic questions, if they are to be given their highest educational value, should be studied scientifically. That is, these questions should be investigated with relation to the district in which the school is located, by means of inquiries or surveys which will collect the facts. For example, under the topic of utilities, an inquiry may be made to discover how many and what kind of household conveniences are in the district; under the head of organizations, the institutes, clubs, and other social and economic associations in the rural district may be listed and tabulated, with their membership, officers, and different activities.

This paper does not undertake to say how much of the work outlined it is possible to carry on in any school. Nor does it indicate a division between public and high school programmes. It is urged, however, that whatever selection is made,—and some selection must

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be made—the topics selected be required to serve the interests of true education, namely, the development of personal power through discipline of the faculties of observation and judgment; the cultivation of the sense of

social and moral obligation in the social, civic, and economic topics offered; and vocational training by the application of skill acquired and knowledge gained to the practice of agriculture.

AGRICULTURE IN ONTARIO SCHOOLS

Report of the Western Ontario O. A. C. Alumni Association

AT a meeting held at Chatham on January 26, the following report of a special committee on agriculture in schools was adopted by the Western Ontario O.A.C. Alumni Association. The committee comprised the following: J. H. Wheaton, chairman, Lieut.-Col. W. J. Brown, and H. S. Fry.

"Your committee, appointed to consider the problems related to the teaching of agriculture in schools, with special reference to the Province of Ontario, beg leave to report as follows:—

"Your committee fully recognize the importance of this matter, and being unwilling to accept responsibility for any recommendations not designed to further the welfare of the country at large, have established certain considerations which they regard as basic and fundamental to a wise development of citizenship in Canada, and upon which they are content to rest the wisdom of their conclusions. These considerations are:—

"(1) That the work of food production towards which the agricultural industry makes by far the most important contribution, lies at the base of all effort, whether social, intellectual, scientific or industrial, that is made by any people.

"(2) That the first object of education in any civilized country is to develop citizenship and to provide the means wherewith each individual of the younger generations may gain some knowledge of art and science so that the maximum amount of intellectual devel-

opment may take place, and also that each individual may gradually acquire a knowledge and understanding of the country's affairs that will not be prejudicial to the welfare of any other class of the population.

"(3) That 'rural depopulation' is not only a social problem of the province of Ontario, but that it is likewise a serious social problem of the whole of the British Empire, a fact which lends added significance to the trend cityward of farm boys and girls and which is, at least in some measure, the result of an educational scheme in which the work of food production is not given that consideration to which it is, by right of national importance, entitled;

"(4) That the tendency toward misunderstanding of agricultural problems on the part of urban communities is unfortunate and is due directly to ignorance of fact and that it would be in the interests of social and political progress if the majority of the inhabitants of the country were to receive some education with reference to the problems of the minority.

"(5) That notwithstanding the desirability of a further industrial development of the urban centres of Canada, the fact cannot be lost sight of that Canada's future is indissolubly bound up with the future of agriculture, and that the necessity for a proper and thorough understanding of this fact is sufficient justification for a sympathetic study of

agriculture by every citizen through the medium of our common and high school systems.

"It is therefore with these several considerations in mind that we bring before you the following recommendations:—

"1. That this association favour the incorporation of a greater amount of agricultural teaching in the curricula of our public and high schools.

"2. That we place ourselves on record as strongly opposing the teaching of agriculture as a vocational subject with a view to influencing in any respect by means of our educational system the choice of any individual as to his or her own future avocation.

"3. That agriculture be made compulsory in our public schools and that it be used as a background for the study of Nature in such a manner that the very close relation of nature study and the several natural sciences to agriculture be utilized in our public school system to teach the place of these sciences in agricultural production without studied reference to farming as an art.

"4. That we recognize the school garden as an important aid to agricultural teaching, but that it be conducted with greater consideration for its educational value in relation to the study of rural science than for its possibilities in the production of quantities of fruit, vegetable, cereal, root and forage crops.

"5. That we favour supplementing this indirect method of teaching agriculture through the medium of rural science by a greater number of agricultural references when lessons are being taught in other subjects than Nature Study, and that this suggestion apply with particular force to the teaching of reading, arithmetic and geography.

"6. That agricultural teaching be likewise compulsory in our high and continuation schools and collegiate insti-

tutes, but that the pupils in these educational institutions be given instruction more closely touching upon the art of farming as well as instruction in rural science.

"7. That the present system of granting bonuses to teachers who will voluntarily qualify for teaching in Elementary Agriculture be abolished and that rural science as referred to herein be raised to the full status of a normal school or other preparatory teaching-course subject.

"8. That, similarly, the system of bonuses to inspectors who are able to induce teachers to voluntarily qualify for the teaching of Elementary Agriculture be abolished and that inspectors be qualified and empowered at least after five years' time from September, 1920, to enforce the teaching of rural science as suggested in these recommendations.

"9. That for those teachers who are now teaching in the public schools of Ontario and for science masters of high schools and collegiate institutes, who are not now qualified to conduct classes in rural science, compulsory summer courses be prescribed at some institution such as the Ontario Agricultural College, so that at least after five years' time from September, 1920, every person who now should teach this or these subjects will have become qualified to do so.

"10. That this association urge that these recommendations or others substantially the same be given effect to by the Ontario Department of Education with the least possible delay, and that copies of this report be laid before the Minister of Education by the Secretary of this association.

"'Rural Science,' as used in this report, for lack of a more complete and satisfactory term, has reference to the teaching of agriculture through the medium of nature study as outlined in the third recommendation of this report."

HOW TO GET THE BEST RESULTS FROM SCHOOL FAIRS

BY JEAN-CH. MAGNAN, B.S.A., DISTRICT AGRONOMIST, ST. CASIMIR, PORTNEUF, QUEBEC

I BELIEVE that one of the most useful things the school fairs can accomplish is to make the agricultural profession more popular and better respected among country boys and girls, to train them for their future duties as progressive farmer citizens, and make them realize the benefits that can be got out of farming when it is intelligently done by interested people. The school fair gives the finishing touch to the work of agricultural teaching. It is a community demonstration, where everyone receives a reward for his labour and where all unite in giving mother earth a token of gratitude and respect. This testimonial creates a lasting impression on the mind of the children and corrects any false ideas that they may perhaps have entertained regarding the farmer's calling.

In order to accomplish this purpose, it is necessary that the school fair should be successful. As the first agricultural school fair (French section) of the province of Quebec was held in our district, at St. Casimir (Portneuf) on September 12, 1914, and as we have been successful in organizing each year since an average of six school fairs in the county, I might point to the following as being the main factors of success:—

(a)—Educational propaganda among the parish authorities (school, civil and religious) showing the usefulness and the benefits of the fairs, in order to secure their sympathy in the work as well as their active co-operation. Generally speaking, the community follows the leaders of the parish in a movement of this kind.

(b)—Making the teachers and school trustees realize that the school fair is

the crowning of their agricultural teaching work, and that they will be given the credit for this work by the parish.

(c)—An essential condition for success (probably the chief) is to establish good school-home gardens, of a size proportionate with the age and capacity of the children, to visit them carefully, and create a healthy rivalry among the pupils, and even take the parents to their children's gardens and make them see the benefits of the fair.

(d)—The organization of a boys' and girls' gardening club, the young members of which do some agricultural work at school and at home, is always a factor of success for the fair, as the members attend to many of the details during the fair. Pupils thus get a training in co-operation, in responsibility, and their spirit of initiative is developed. The pupils, teachers, and school trustees, should be made to understand that the fair is their work, and that the efforts of every one, from the humblest to the most influential, are required to make it a success.

(e)—Nothing should be neglected to make the fair attractive, and the parish authorities should be invited to visit the exhibits of the pupils. The co-operation of the priest, mayor, school trustees or officials of the Agricultural Association should be secured. The children should see that agriculture is honoured by everyone. The fair should be a parish Educational Day, in every sense of the word. This is the day for the young farmers, a never-to-be forgotten day, and to the advantage of agriculture.

(f)—School trustees and other persons who understand the advantages of such

a day should grant prizes for the winners of the competition. Judges should always be fair, so that every one may be satisfied.

(g)—The real factor of success will always be the qualified teacher, who teaches agriculture to the children, according to the best pedagogical prin-

ciples. The school and the teaching are only what the master makes them.

Good agricultural elementary education is the best work in rural and social reconstruction that may be accomplished by an intelligent citizen. Progressive agriculture will never enter an old brain, poorly formed in the beginning.

PUBLIC SCHOOL STOCK-JUDGING CONTEST

BY W. G. MARRITT, AGRICULTURAL REPRESENTATIVE, WENTWORTH COUNTY, ONTARIO

Live Stock Judging among school boys in Wentworth county was begun in the spring of 1919, when announcement was made that contests would be conducted at each of the School Fairs for all boys who would compete. Each school was asked to enter a team of three boys and also appoint a coach who would teach the boys the fundamentals of stock-judging. Over sixty per cent of the schools complied with the request and appointed, in most cases, junior farmers who had attended a 'four weeks' course in Agriculture. In four instances farmers who had attended the Ontario Agricultural College acted as coaches. The result of this work even exceeded the expectations of the promoters and of the stockmen who acted as judges. In every School Fair district boys competed in this contest with a grand total of one hundred and twenty students taking part. A final contest was held at the annual fair at Rockton, when nine of the winning teams in each district competed in a county competition. Prizes were donated for this contest by the Wentworth Milk Producers' Association. Considerable interest was taken in this contest as was shown by the large number of spectators who watched the youthful judges place and give their reasons on the different animals.

A special Spring Judging Contest was held for all the boys in the county at the Armour and Company plant, Hamilton, when eighty-one boys took

part. In the forenoon four classes of stock, two of beef cattle and two of bacon hogs, were judged, for which sixty dollars in prizes was donated by the Wentworth Board of Agriculture. At noon Armour and Company tendered all the contestants a luncheon. Immediately afterwards the boys were shown through the plant and each operation explained. A beef animal and a bacon hog were cut up by one of the cutters, showing the value of each piece of meat. Many expressions were given by the farmers throughout the county of the value of this contest and demonstration, several stating that when they were boys, it was not possible for them to secure this valuable information.

In the spring of 1920 the same plan was followed of asking the schools to appoint coaches and state whether they wished to enter teams in the contest. A few more schools took part in the contest this year, with even better results. District judging contests were conducted at each of the school fairs. A final contest for the county was held in the fall. In the forenoon, the contest was held at the Ontario Hospital Farm, when classes of Holstein cows were judged. In the forenoon the contest was continued at Mr. Sherwood's, Freeman, when two good classes of Shorthorns were placed by the boys. Forty-two boys, being the winning teams in their districts, competed.

Considerable favourable comment was made by the judges on the work

THE AGRICULTURAL GAZETTE OF CANADA

done. The winning team made a total of 1,076 marks out of a possible 1,200, making their average score for each class 89 marks. The judges for this contest, who were experienced stockmen, had never met the boys before and did not know from any source the boys who had the best chance to win the trophy.

In order to encourage the stock-judging work, a special trophy was donated by the Junior Farmers' Associations in six townships. It was to be given to the team of three boys from any school which made the highest number of points in the contest. A trophy was donated also by Grafton and Company for the winner in the county competition. A special prize to the highest contestant in each district was given by the School Fair Association of a three-day trip to the Provincial Winter Fair at Guelph. Eight of the winners

spent three days with a guide at the fair, and also visited the Ontario Agricultural College. The boys appreciated this trip and should receive much good from what they heard and saw during their visit to Guelph. Prizes consisting of live stock books and cash were also given to the other winners.

The coaches who assist the boys in training form the most important link in making a success of these contests. The coach is required to give the contestants at least two lessons in judging. Many times the coach exceeds this limit, and in several cases the coaches took the boys on a trip where they visited some of the best live stock farms in this and other counties. This work can only be continued successfully where coaches are secured who take a deep interest in the work.

RURAL SCIENCE CAMP FOR NEW BRUNSWICK TEACHERS

FOLLOWING the plan inaugurated last year, the teachers in attendance at the Rural Science School, Sussex, New Brunswick, will again have an opportunity of living under canvas during the four weeks, July 12 to August 9, that the school is in session. Last year the outdoor life of the camp, which is within five minutes walk of the Agricultural Building, was greatly appreciated by the student-teachers, who had been confined to the school room for so many months. Not only did it afford relaxation and reduce living expenses, but provided facilities for studying forest trees and plant and insect life.

As was the case last year, the management of the camp will be left largely in the hands of the students. Committees were formed to see that certain necessary activities of the camp were carried into effect. For instance, a camp committee is formed with a chaperon as convenor. Other committees, such as sports and social committees, take charge of various

activities. The rules are few, but it is required that these be strictly observed.

A dining room is provided in one of the bungalows, near which all the tents are set up. The camp will be supplied with water and electricity from the town system, these having been laid for the military camp. All other necessary equipment will be provided. No rental is charged, but students share equally the cost of food and cooking. Members of the Sussex Women's Institute will assist in making camp life enjoyable to the students.

Many games may be indulged in, as base ball, tennis, volley ball and others. The river affords excellent facilities for bathing. Many learned to swim last summer while in camp.

Students' railway fares, grants for school gardens, and bonuses for agricultural teaching are provided out of the Federal grant for Agricultural Instruction.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes

CANADA'S TRADE IN FARM PRODUCTS, 1920-21

Statistics of Import and Export Trade in Agricultural Products, Dealing Only with Such as Originate on Canadian Farms, are Presented for the First Time—Raw Products and Those Advanced by Some Degree of Manufacture Classified Separately—United Kingdom and United States Trade Compared

Compiled by the Dominion Bureau of Statistics

External Trade Division

SUMMARY

	Totals	Trade with	
		United Kingdom	United States
	\$	\$	\$
PRINCIPAL FARM PRODUCTS, RAW:			
I. Imported for Consumption—			
Vegetable origin.....	45,573,191	592,563	42,327,365
Animal origin.....	26,138,478	2,572,043	16,598,828
Total Imports.....	71,711,669	3,164,606	58,926,193
II. Exports, Canadian Produce—			
Vegetable origin.....	374,267,129	102,326,649	117,317,085
Animal Origin.....	51,112,424	5,688,353	43,496,673
Total exports.....	425,379,553	108,015,002	160,813,758
PRINCIPAL FARM PRODUCTS, ADVANCED BY MANUFACTURE—			
III. Imported for Consumption—			
Vegetable origin.....	7,339,661	299,675	5,608,893
Animal origin.....	17,520,050	1,283,058	14,853,740
Total Imports.....	24,859,711	1,582,733	20,462,633
IV. Exports, Canadian Produce—			
Vegetable origin.....	78,541,110	32,620,821	17,436,045
Animal Origin.....	91,529,880	73,323,041	9,862,039
Total exports.....	170,070,990	105,943,862	27,298,084

THE AGRICULTURAL GAZETTE OF CANADA

I. Imports into Canada of Principal Raw Materials of Vegetable and Animal Origin, Such as are Produced on Canadian Farms; Also Amounts of Each Received from United Kingdom and United States (Fiscal Year Ended March 31, 1921.)

Articles		Imports for Consumption		
		Total	From United Kingdom	From United States
Of Vegetable Origin				
Fruits—				
Apples, fresh.....	Brl.	273,319		273,319
	\$	1,528,606		1,528,606
Apricots, quinces and nectarines, fresh.....	Lb.	630,419	20	630,399
	\$	57,050	12	57,038
Berries, wild, fresh.....	\$	2,822		2,664
Blackberries, gooseberries and raspberries, fresh.....	\$	163,212		163,212
Cherries, fresh.....	Lb.	477,265		477,265
	\$	108,737		108,737
Cranberries, fresh.....	Brl.	21,841		21,841
	\$	173,634		173,634
Currants, fresh.....	Lb.	22,476		22,476
	\$	1,995		1,995
Grapes, fresh.....	Lb.	6,632,035	600,414	5,979,961
	\$	858,340	129,113	717,711
Peaches, fresh.....	Lb.	6,195,404	120	6,195,284
	\$	442,265	58	442,207
Pears.....	Lb.	12,484,934		12,482,288
	\$	797,645		797,381
Plums.....	Bush.	106,763	16	106,747
	\$	476,459	230	476,229
Strawberries.....	Lb.	2,436,573		2,436,573
	\$	559,777		559,777
Other fruits, fresh.....	\$	28,557		28,060
Total, Fruits, fresh.....	\$	5,199,099	129,413	5,057,251
Grains—				
Barley.....	Bush.	1,232		1,229
	\$	1,904		1,893
Beans.....	Bush.	203,725	4,075	151,518
	\$	637,632	21,165	497,458
Buckwheat.....	Bush.	13,873		13,873
	\$	23,196		23,196
Corn (Indian) for distillation.....	Bush.	318,804		318,804
	\$	344,467		344,467
Corn (Indian) not for distillation.....	Bush.	9,658,960	10	9,520,482
	\$	12,276,943	23	12,084,398
Oats.....	Bush.	939,955		939,734
	\$	661,030		660,433
Peas, split.....	Lb.	149,620		149,300
	\$	9,084		9,046
Peas, n.o.p.....	Bush.	67,339	22	62,450
	\$	248,200	266	234,848
Rye.....	Bush.	4,494		4,494
	\$	10,125		10,125
Wheat.....	Bush.	134,113		134,109
	\$	280,266		280,250
Total Grains.....	\$	14,492,847	21,454	14,146,114
Seeds—				
Beans (seed) from United Kingdom.....	Lb.	15,310	15,310	
	\$	3,612	3,612	
Beet and mangold seed.....	Lb.	1,326,072	101,781	772,219
	\$	291,516	17,474	189,226
Carrot seed.....	Lb.	65,188	5,311	43,736
	\$	21,271	1,634	12,501
Clover seed.....	Lb.	2,498,380	70	2,496,382
	\$	560,247	29	559,276
Flax seed.....	Bush.	536,679	397	353,894
	\$	2,048,154	4,475	1,370,048
Garden and field seeds, n.o.p., in packages over one pound.....	\$	679,781	44,295	582,413
Garden and field seeds, n.o.p., in packages of one pound or less.....	\$	29,468	15,730	12,442
Garden and field seeds, not free, not less than \$5 per lb. etc.....	\$	12,214	2,678	6,200
Mushroom spawn.....	\$	1,360	51	1,309
Peas (seed) from United Kingdom.....	Lb.	157,795	157,795	
	\$	14,927	14,927	
Rape seed, sowing.....	Lb.	180,967	61,335	119,553
	\$	16,202	5,550	10,630
Timothy seed.....	Lb.	9,281,201		9,281,201
	\$	814,023		814,023
Turnip seed.....	Lb.	1,435,748	771,282	169,074
	\$	236,402	132,399	27,508
Total Seeds.....	\$	4,729,177	242,854	3,585,576
Tobacco, unmanufactured.....				
	Lb.	20,007,411	47,401	19,032,367
	\$	13,083,293	38,543	12,108,281

THE AGRICULTURAL GAZETTE OF CANADA

I. Imports into Canada of Principal Raw Materials of Vegetable and Animal Origin such as are Produced on Canadian Farms—*Con.*

(Fiscal Year Ended March 31, 1921.)

Articles	Imports for Consumption		
	Total	From United Kingdom	From United States
Vegetables, fresh—			
Cabbage..... \$	201,167		198,511
Melons..... No.	3,245,339	12	3,244,734
Onions..... \$	453,711	6	453,648
Potatoes..... Bush.	628,604	110,838	450,318
Tomatoes..... Bush.	955,297	29	954,983
Vegetables, fresh, n.o.p..... \$	1,676,205	101	1,695,747
	188,822		188,822
	550,714		550,714
	1,253,357	470	1,109,483
Total, Vegetables, fresh..... \$	4,763,758	111,415	4,458,421
Broom Corn..... \$	511,222		511,222
Hay..... Ton	50,789		50,789
Hemp, dressed or undressed..... Cwt.	1,300,892		1,300,892
Hops..... Lb.	47,090		29,805
Manures, vegetable..... Cwt.	456,646	4	281,146
Straw..... Ton	1,681,822	57,436	1,498,185
Teasels..... \$	1,000,711	48,289	843,507
	24,064	14	24,050
	13,107	119	12,988
	1,430		1,439
	18,237		18,237
	4,202	472	3,730
Total, above Vegetable Products..... \$	45,573,191	592,563	42,327,365
<i>Of Animal Origin</i>			
Animals Living (except for Exhibition and for Improvement of Stock)—			
Cattle, neat, imported by residents..... No.	3,555	29	3,526
Cattle, n.o.p..... \$	252,506	6,000	246,506
Hogs..... Lb.	35,624	800	34,824
Horses over one year old valued at less than \$50 per head..... No.	12,660		12,607
Horses, n.o.p..... \$	4,801		4,788
Sheep, imported by residents..... No.	113		91
Sheep, n.o.p..... \$	5,458		4,358
Other..... No.	1,879	19	1,860
	251,729	4,025	247,704
	714		714
	5,101		5,101
	1,255	26	1,229
	10,836	520	10,316
	54,546	5,610	48,729
Total Animals, Living (except for Exhibition)..... \$	620,601	16,955	602,326
Animals for Improvement of Stock—			
Cattle..... No.	750	366	384
Fowls, domestic, pure bred..... No.	491,718	301,841	189,877
Goats..... \$	161,007	657	160,350
Hogs..... No.	77,134	1,011	76,123
Horses..... No.	43		43
Sheep..... \$	9,055		9,055
Other Animals..... No.	63		62
	6,940	100	6,840
	288	20	268
	193,560	53,776	139,784
	27,075	136	26,939
	266,725	9,595	257,130
	23,537		23,537
Total Animals for Improvement of Stock..... \$	1,068,669	366,323	702,346
Total Animals, Living (except for Exhibition)..... \$	1,689,270	383,278	1,304,672

THE AGRICULTURAL GAZETTE OF CANADA

I. Imports into Canada of Principal Raw Materials of Vegetable and Animal Origin such as are Produced on Canadian Farms—*Concluded.*

(Fiscal Year Ended March 31, 1921.)

Articles	Imports for Consumption		
	Total	From United Kingdom	From United States
Bones, crude..... Cwt.	38,879	505	38,362
\$	73,924	490	72,751
Horns, Hoofs, etc..... \$	1,085	906	177
Feathers, dressed..... \$	7,151	3,873	3,180
Feathers, undressed..... \$	133,758	553	123,832
Hides and Skins—			
Calf skins and kips, raw..... Lb.	3,139,130	7,440	1,397,652
\$	1,867,387	1,596	540,924
Cattle skins, raw..... Lb.	19,054,909	474,750	9,364,224
\$	6,340,013	213,247	3,057,835
Pelts, raw..... \$	41,759	.....	41,752
Sheep skins, raw..... Lb.	2,228,437	87,323	815,099
\$	1,021,418	28,649	258,786
Other hides and skins, raw..... Lb.	2,555,959	447,916	1,228,571
\$	1,382,160	249,242	537,043
Total Hides and Skins, raw..... \$	10,652,737	492,734	4,436,340
Hair, cleaned or uncleaned..... Lb.	719,342	1,186	717,985
\$	99,436	3,925	94,307
Meats, fresh—			
Beef, fresh..... Lb.	1,632,862	.....	1,541,431
\$	299,542	.....	290,125
Mutton and lamb, fresh..... Lb.	7,847,701	.....	2,910,737
\$	1,272,165	.....	562,806
Pork, fresh..... Lb.	22,402,444	.....	22,402,444
\$	3,862,311	.....	3,862,311
Poultry and game, fresh..... \$	39,884	2,829	22,479
Other meats, fresh..... Lb.	2,352,784	.....	2,165,587
\$	297,969	.....	271,665
Total, Meats, Fresh..... \$	5,771,871	2,829	5,009,386
Milk and cream, fresh..... \$	45,973	.....	45,973
Eggs..... Doz.	5,341,936	1	5,201,417
Guano..... Cwt.	2,344,297	15	2,292,912
\$	32,283	9	32,274
Honey..... Lb.	95,900	19	95,881
\$	683,149	39,144	203,936
Sausage casings, not cleaned..... \$	128,751	5,939	42,640
Wool, Leicester, Cotswold, etc..... Lb.	5,660	.....	5,660
\$	8,426	3,515	2,602
Wool, n.o.p..... Lb.	4,845	2,735	1,184
\$	9,277,237	2,107,223	6,667,928
\$	5,083,820	1,674,747	3,069,933
Total Above Animal Products..... \$	26,138,478	2,572,043	16,598,828
Grand Total Imports of Raw Materials such as are Produced on Canadian Farms... \$	71,711,669	3,164,606	58,926,193

THE AGRICULTURAL GAZETTE OF CANADA

II. Exports from Canada of Principal Raw Materials of Vegetable and Animal Origin Produced on Canadian Farms; Also Amounts of Each Sent to United Kingdom and United States

(Fiscal Year ended March 31, 1921.)

Articles		Exports of Canadian Produce		
		Total	To United Kingdom	To United States
<i>Of Vegetable Origin</i>				
Fruits—				
Apples, fresh.....	Brl.	1,358,499	1,272,533	48,107
Berries.....	\$	8,299,099	7,902,013	171,226
Other fresh fruits.....	\$	377,230		376,661
		570,252	5,141	556,934
Total Fresh Fruits.....	\$	9,246,581	7,907,154	1,104,821
Grains—				
Barley.....	Bush.	8,563,553	7,940,979	304,878
	\$	11,469,050	10,561,195	472,033
Beans.....	Bush.	14,376	20	12,282
	\$	64,800	120	53,794
Buckwheat.....	Bush.	271,838	19,976	247,884
	\$	342,549	22,024	315,815
Corn (Indian).....	Bush.	17,560	2	8,616
	\$	34,615	10	16,692
Oats.....	Bush.	14,321,048	7,096,419	4,765,202
	\$	14,152,033	6,623,635	4,694,519
Peas, split.....	Bush.	56,263	613	2,402
	\$	241,092	2,415	9,395
Peas, whole.....	Bush.	113,262	31,775	47,696
	\$	606,342	181,786	263,812
Rye.....	Bush.	3,201,430	1,108,789	717,086
	\$	6,231,170	2,331,294	1,344,976
Wheat.....	Bush.	129,215,157	29,294,612	42,324,894
	\$	310,952,138	73,489,796	91,442,298
Total Grain.....	Bush.	155,774,487	45,493,185	48,430,940
	\$	344,093,789	93,212,275	98,613,334
Seeds—				
Clover, alfalfa.....	Bush.	115		115
	\$	2,151		2,151
Clover, alsike.....	Bush.	115,978	42,767	62,091
	\$	1,674,114	716,680	778,254
Clover, red.....	Bush.	2,937	118	2,034
	\$	30,409	1,991	24,014
Clover, other.....	Bush.	60,225	941	59,284
	\$	298,786	4,422	294,364
Flax.....	Bush.	60,528	51,304	9,224
	\$	374,492	357,974	16,518
Grass.....	Bush.	9390.6	1,388	81,130
	\$	202,554	6,848	167,445
Other.....	\$	28,562	432	23,142
Total Seeds for Sowing.....	\$	2,611,068	1,088,347	1,305,888
Tobacco, unmanufactured.....	Lb.	200,153	160,112	26,831
	\$	130,457	90,389	34,097
Vegetables, Fresh—				
Beets, sugar.....	Ton	11,502		11,502
	\$	103,175		103,175
Potatoes.....	Bush.	5,036,769		4,204,684
	\$	9,657,612		8,328,862
Turnips.....	Bush.	1,786,755		1,756,538
	\$	460,506		444,830
Other.....	\$	152,123	363	105,284
Total Fresh Vegetables.....	\$	10,373,416	363	8,982,151
Flax seed, n.o.p.....	Bush.	1,343,591		1,343,591
	\$	3,473,610		3,473,610
Hay.....	Ton	179,398	374	162,763
	\$	4,210,594	9,629	3,712,979
Hops.....	Lb.	75,308	19,265	26,976
	\$	55,433	18,492	20,226
Straw.....	Ton	7,042		6,909
	\$	72,181		69,979
Total above Vegetable Products.....	\$	374,267,129	102,326,649	117,317,085

THE AGRICULTURAL GAZETTE OF CANADA

II. Exports from Canada of Principal Raw Materials of Vegetable and Animal Origin Produced on Canadian Farms, &c,—*Con.*

(Fiscal Year Ended March 31, 1921.)

ARTICLES	Exports of Canadian Produce.		
	Total	To United Kingdom	To United States
<i>Of Animal Origin.</i>			
Animals for Improvement of Stock—			
Cattle..... No.	1,342		1,270
\$	635,662		616,337
Poultry..... No.	12,332	28	12,013
\$	64,897	450	63,091
Sheep..... No.	1,065		1,007
\$	66,025		64,055
Swine..... No.	69		62
\$	7,323		6,778
Total Animals for Improvement of stock.....	773,907	450	750,261
Animals other, n.o.p.—			
Cattle, one year old or less..... No.	72,822		72,731
\$	1,474,521		1,473,222
Cattle, over one year old..... No.	223,689	131	221,278
\$	19,989,370	19,350	19,759,329
Horses..... No.	3,626	50	2,925
\$	780,977	11,100	651,129
Poultry..... No.	707,303		706,806
\$	781,280		780,510
Sheep..... No.	185,382		183,634
\$	1,717,734		1,700,992
Swine..... No.	1,179		329
\$	14,202		5,333
Other Animals..... \$	351,672	4,050	326,457
Total Animals, Other, n.o.p..... \$	25,109,756	34,500	24,696,972
Bones, crude..... Cwt.	102,453		102,290
\$	227,575		226,965
Horns and hoofs..... \$	28,795		28,568
Hair..... \$	226,365	195	226,105
Hides and Skins—			
Cattle hides..... Cwt.	222,163	1,302	220,861
\$	3,957,230	15,180	3,942,050
Sheep skins..... Cwt.	43,397		43,397
\$	498,073		498,073
Other hides and skins..... \$	276,904	2,694	268,489
Total Hides and Skins (except Furs)..... \$	4,732,207	17,874	4,708,612
Meats—			
Beef, fresh..... Cwt.	519,994	88,838	358,383
\$	8,331,298	1,262,349	5,829,181
Mutton and lamb, fresh..... Cwt.	64,055		62,421
\$	1,626,792		1,595,111
Pork, fresh..... Cwt.	16,014	2,948	9,338
\$	493,220	75,738	316,151
Poultry..... \$	558,825	12,763	496,170
Total Fesh Meats..... \$	11,010,135	1,350,850	8,236,613
Cream..... Gal.	1,279,195		1,279,195
\$	1,987,461		1,987,461
Milk..... Gal.	1,508,618		1,508,618
\$	412,916		412,916
Eggs..... Doz.	6,579,853	6,266,169	191,258
\$	4,425,856	4,229,608	118,513
Honey..... Lb.	36,929	60	36,164
\$	9,195	20	8,996
Wool..... Lb.	7,288,373	130,619	7,128,065
\$	2,168,256	54,856	2,094,691
Total, above Animal Products..... \$	51,112,424	5,688,353	43,496,673
Grand Total Exports of Principal Raw Materials produced on Canadian farms..... \$	425,379,553	108,015,002	160,813,758

THE AGRICULTURAL GAZETTE OF CANADA

III. Imports into Canada of Principal Materials of Vegetable and Animal Origin, Such as are Produced on Canadian Farms, and which have Undergone Some Process of Manufacture ; Also Amounts of Each Received from United Kingdom and United States

(Fiscal Year ended March 31, 1921.)

Articles	Imports for Consumption.		
	Total	From United Kingdom	From United States
<i>Of Vegetable Origin</i>			
Cider, clarified..... Gal.	2,807	894	1,859
\$	7,423	2,902	4,420
Fruits, prepared—			
Apples, dried..... Lb.	1,102,853		1,102,853
\$	39,043		39,043
Apricots, dried..... Lb.	687,051		686,862
\$	164,531		164,497
Peaches, dried..... Lb.	1,154,843		1,154,843
\$	210,351		210,351
Prunes and plums, unpitted..... Lb.	10,494,520		10,489,100
\$	1,459,102		1,458,027
Fruits, canned..... Lb.	19,383,538	97,976	13,374,563
\$	2,795,447	12,251	1,947,618
Jellies, jams and preserves, n.o.p..... Lb.	1,434,109	860,011	242,459
\$	397,745	224,160	75,846
Total, Fruits, prepared..... Lb.	34,256,914	957,987	27,050,680
\$	5,066,219	236,411	3,395,382
Flour and Mill Products—			
Buckwheat meal..... Cwt.	162		160
\$	1,128		1,112
Cornmeal..... Brl.	28,620		28,617
\$	207,616		207,610
Malt flour, not less than 50 per cent malt..... Lb.	243,366	18,000	225,366
\$	11,351	1,760	9,591
Malt flour, less than 50 per cent malt..... Lb.	20,384		20,384
\$	3,234		3,234
Oatmeal and rolled oats..... Lb.	20,760	6,234	14,526
\$	1,912	915	997
Rye flour..... Brl.	3,458		3,444
\$	19,919		19,681
Wheat flour..... Brl.	27,583	1	27,554
\$	269,867	12	269,366
Barley, pot, pearl, etc..... Lb.	109,011	105,826	3,104
\$	25,884	25,726	149
Bran and mill feed..... \$	110,169	321	109,505
Hominy..... \$	11,981		11,981
Malt..... Lb.	7,231,695	1,980	7,229,715
\$	319,314	226	319,088
Semolina..... \$	17,025	578	16,447
Total Flour and Mill Products..... \$	999,400	29,538	968,761
Maple sugar and syrup..... Lb.	5,797		5,797
\$	1,443		1,443
Vegetables, prepared—			
Potatoes, dried..... \$	7,217		7,211
Baked beans, in cans..... Lb.	821,709		821,709
\$	72,373		72,373
Corn in cans..... Lb.	710,157		710,157
\$	58,517		58,517
Tomatoes in cans..... Lb.	548,980		508,906
\$	40,629		34,304
Vegetables, n.o.p., in cans..... Lb.	6,212,347	6,918	4,315,710
\$	952,522	1,616	466,965
Total, Vegetables, prepared..... \$	1,131,258	1,616	639,370
Vinegar above proof..... Gal.	43,407	18,247	25,160
\$	15,241	11,525	3,716
Vinegar, not above proof..... Gal.	69,873	18,261	43,761
\$	34,789	17,683	12,366
Fibrilla, flax fibre and tow..... Cwt.	7,772		7,745
\$	83,888		83,435
Total, above Vegetable Products..... \$	7,339,661	299,675	5,608,893

THE AGRICULTURAL GAZETTE OF CANADA

III. Imports into Canada of Principal Materials of Vegetable and Animal Origin, such as are Produced on Canadian Farms, &c—*Con.*

(Fiscal Year Ended March 31, 1921.)

Articles	Imports for Consumption		
	Total	From United Kingdom	From United States
<i>Of Animal Origin</i>			
Bone dust, etc. Cwt.	52,780	738	52,042
\$	358,501	7,600	350,901
Leather, unmanufactured—			
Belting leather..... \$	469,331	395,595	73,736
Calf, etc., skins, tanned..... \$	274,965	11,635	262,119
Calf, etc., skins, dressed, waxed, etc..... \$	1,799,308	152,188	1,643,495
Harness, leather..... \$	69,023	16,469	52,385
Skins for Morocco leather..... \$	12,589	2,655	9,934
Sole leather..... \$	234,872	20,001	214,871
Tanners scrap leather..... \$	19,638	.....	19,638
Upper leather, not dressed, etc..... \$	51,048	.....	51,048
Other leather, dressed, etc..... \$	210,667	56,818	152,815
Other leather and skins..... \$	243,468	54,436	183,679
Total Leather, unmanufactured..... \$	3,384,909	709,797	2,663,720
Hair curled or dyed..... \$	71,698	15,464	55,996
Horse hair, cleaned, etc..... Lb.	150,889	2,644	136,404
\$	123,289	6,430	107,440
Meats, prepared—			
Bacon and hams..... Lb.	6,823,423	303	6,817,359
\$	1,548,084	111	1,545,380
Beef, pickled..... Lb.	1,258,718	.....	1,257,389
\$	138,308	.....	138,071
Canned meats..... Lb.	2,026,085	1,130,112	450,719
\$	557,811	304,180	134,857
Dried or smoked meats..... Lb.	426,092	.....	411,505
\$	121,525	.....	115,542
Extracts of meat..... \$	78,899	51,133	16,011
Pork, barrelled in brine..... Lb.	10,849,632	.....	10,846,702
\$	1,735,124	.....	1,734,370
Pork, dry, salted..... Lb.	2,062,215	.....	2,061,447
\$	438,675	.....	438,345
Sausage..... Lb.	254,405	.....	227,064
\$	97,899	.....	80,425
Soups..... \$	818,409	10,242	795,300
Other meats, salted..... Lb.	450,768	.....	448,956
\$	121,878	.....	121,107
Total Meats, prepared..... \$	5,656,612	365,666	5,119,408
Butter..... Lb.	3,741,628	112	2,207,077
\$	1,805,709	49	886,555
Cheese..... Lb.	551,040	7,491	453,882
\$	253,647	4,582	206,585
Milk, condensed..... Lb.	131,026	3,013	127,553
\$	21,215	1,596	19,496
Beeswax..... Lb.	242,589	78,047	93,870
\$	91,118	27,413	39,568
Lard..... Lb.	11,493,226	.....	11,493,226
\$	1,902,768	.....	1,902,768
Lard compound..... Lb.	3,245,408	264,412	2,980,996
\$	467,392	70,271	397,121
Tallow..... Lb.	301,323	.....	295,353
\$	47,001	.....	46,404
Grease, rough, for soap and oils..... Lb.	14,310,759	637,220	13,574,343
\$	1,532,550	57,013	1,459,783
Grease and degrass for dressing leather..... Lb.	906,395	169,554	718,712
\$	91,265	14,916	73,048
Oleomargarine..... Lb.	4,630,747	.....	4,630,747
\$	1,206,351	.....	1,206,351
Rennet..... \$	110,624	128	83,684
Sausage casings, n.o.p..... \$	395,401	2,133	234,912
Total above Animal Products..... \$	17,520,050	1,283,058	14,853,740
Grand Total, Imports of Principal Materials, such as are produced on Canadian Farms, which have undergone some process of manufacture..... \$	24,859,711	1,582,733	20,462,633

THE AGRICULTURAL GAZETTE OF CANADA

IV. Exports from Canada of Principal Materials of Vegetable and Animal Origin, Produced on Canadian Farms, which have Undergone Some Process of Manufacture; Also Amounts of Each Sent to United Kingdom and United States

(Fiscal Year ended March 31, 1921.)

Articles	Exports of Canadian Produce.		
	Total	To United Kingdom	To United States
<i>Of Vegetable Origin</i>			
Cider..... Gal.	72,544		61,787
\$	52,565		46,175
Fruits, prepared—			
Apples, dried..... Lb.	2,066,999	1,112,885	125,756
\$	315,372	188,774	15,245
Canned fruits..... Lb.	751,520	514,239	74,565
Fruits, dried, n.o.p..... Lb.	31,629		24,178
\$	7,405		5,810
Total, Fruits, prepared..... \$	1,074,297	703,013	95,620
Flour, Meal, etc.—			
Bran, shorts and middlings..... Cwt.	819,781	4,670	719,948
\$	1,481,097	6,170	1,236,851
Corn meal..... Brl.	24,588	242	840
\$	187,003	2,000	7,722
Malt..... Bush.	629,620	39,747	
\$	1,350,201	39,747	
Oatmeal and rolled oats..... Cwt.	397,266	357,241	3,544
\$	2,343,965	2,096,098	19,709
Rye flour..... Brl.	10,833		450
\$	104,613		5,179
Screenings..... Cwt.	1,152,385	7,763	1,122,483
\$	702,144	10,847	651,370
Wheat flour..... Brl.	6,017,032	2,746,780	1,187,750
\$	66,520,490	28,896,091	12,023,090
All other meal..... Brl.	855		345
\$	6,805		3,439
Total Flour, Meal, etc..... \$	72,696,318	31,050,953	13,947,360
Maple sugar..... Lb.	7,999,233	18,924	7,979,970
\$	1,962,258	5,499	1,956,637
Maple syrup..... Gal.	11,254	1,785	9,373
\$	31,767	5,295	26,162
Vegetables, prepared—			
Vegetables, canned..... Lb.	4,779,126	2,928,361	840,390
\$	408,203	274,040	39,312
Vegetables, dried..... Lb.	219,005		209,541
\$	59,747		56,964
Total, Vegetables, prepared..... \$	467,950	274,040	96,276
Fodders, other, n.o.p..... \$	932,406	1,158	842,035
Vinegar..... Gal.	72,882		64,761
\$	25,220		21,721
Flax fibres and flax tow..... Cwt.	26,688	9,538	13,100
\$	1,298,329	580,863	404,059
Total, above Vegetable Products..... \$	78,541,110	32,620,821	17,436,045

THE AGRICULTURAL GAZETTE OF CANADA

IV. Exports from Canada of Principal Materials of Vegetable and Animal Origin, Produced on Canadian Farms, &c.—*Con.*

(Fiscal Year ended March 31, 1921.)

ARTICLES	Exports of Canadian Produce		
	Total	To United Kingdom	To United States
<i>Of Animal Origin</i>			
Bonedust, meal, etc..... Cwt.	32,196		32,196
\$	64,135		64,135
Meats, prepared—			
Bacon and Hams..... Cwt.	982,338	974,228	5,997
\$	31,492,407	31,201,380	203,960
Beef, pickled..... Cwt.	15,072		1,994
\$	173,291		29,764
Canned meats..... Lb.	437,239	283,732	85,739
\$	220,437	168,101	35,287
Extracts of fluid beef..... Lb.	20,987	10,642	6,891
\$	13,873	7,732	4,070
Pork, dry, salted..... Cwt.	9,125	1,096	394
\$	198,502	33,676	6,599
Pork pickled, in barrels..... Cwt.	6,118	44	806
\$	110,750	1,160	15,246
All other meats..... Lb.	11,060,647	3,107,218	2,568,483
\$	1,255,091	399,165	439,605
Total, Meats, prepared..... \$	33,464,351	31,811,214	734,531
Leather, unmanufactured—			
Harness leather..... \$	435,076	3,655	416,559
Sole leather..... Lb.	1,391,510	237,369	828,859
\$	870,183	184,151	429,568
Upper leather..... \$	3,397,075	2,189,945	797,284
Other unmanufactured leather..... \$	436,094	63,178	337,678
Total Unmanufactured Leather..... \$	5,138,428	2,440,929	1,981,08
Butter..... Lb.	9,739,414	2,098,716	5,993,786
\$	5,128,831	1,016,935	3,156,951
Cheese..... Lb.	133,620,340	122,652,290	641,950
\$	37,146,722	34,024,595	184,883
Milk, condensed..... Lb.	49,147,451	21,904,938	14,919,288
\$	8,187,937	3,644,723	2,352,319
Grease and grease scraps..... Cwt.	21,672	113	21,170
\$	108,917	2,149	104,579
Lard..... Cwt.	30,961	12,612	1
\$	617,337	202,990	15
Lard compounds and substitutes..... Cwt.	2,334	86	22
\$	57,095	2,424	511
Tallow..... Cwt.	18,964		18,512
\$	172,146		165,396
Wax..... Lb.	102,173	24,356	76,471
\$	44,267	6,594	37,270
Glue stock..... Cwt.	39,620		39,620
\$	133,541		133,541
Sausage casings..... \$	579,674	138,682	296,069
Tails..... \$	18,329		18,329
Tankage..... Cwt.	232,681		232,641
\$	554,706		554,506
Other Animal Products..... \$	113,464	31,806	77,915
Total above Animal Products..... \$	91,529,880	73,323,041	9,862,039
Grand Total Exports of Principal Materials produced on Canadian farms which have undergone some process of manufacture..... \$	170,070,990	105,943,862	27,298,084

TREE PLANTING FOR THE PRAIRIE PROVINCES

BY NORMAN H. ROSS, SUPERINTENDENT OF FORESTRY, DEPARTMENT OF THE INTERIOR,
INDIAN HEAD

ALTHOUGH on the prairies trees are of immense value from a material standpoint, as wind-breaks, shelter belts, etc., I believe that under prairie conditions the greatest value of trees is derived from their aesthetic qualities, the beauty they add to their surroundings and the general feeling of rest and comfort they lend to the home.

It was natural that the early settlers, coming as they did from eastern Canada and other countries abundantly blessed with natural forests, should almost immediately have tried to improve the appearance of their new homes by planting trees, in the majority of cases trees being brought from Ontario, but little advantage was taken of the native varieties which were found in a few localities along the river bottoms and protected ravines.

These eastern trees were planted generally as such trees would have been handled in Ontario, without any special preparation of the soil; and almost invariably the plantings were a failure. This led to the general impression that trees could not be grown successfully. Eventually, however, individuals met with success by using such native kinds as maple, ash and elm, and it began to be realized that while the majority of eastern trees would not prove hardy under prairie conditions, excellent results could be obtained by properly handling the native varieties.

So far as Saskatchewan is concerned the experiments with tree planting as carried out on the Indian Head Experimental Farm have undoubtedly proved the greatest factor in furthering tree culture generally throughout the province. Not only were all the native varieties planted, but immense numbers of eastern and European varieties were given trial. As a result of this

work, authoritative information soon became available as to just what kind of trees could be grown and what varieties should be left alone. In addition to the native species, many Russian and Northern European sorts proved suitable to this climate. Of these exotic varieties the Russian poplars, Russian willows, Caragana, and Scotch pine have proved particularly adaptable, and are now widely used everywhere in the West. After sixteen years' experimenting, the late Dr. Saunders published a very valuable bulletin on the trees and shrubs tested on the western farms and listed all varieties that might reasonably be expected to do well. This bulletin, which may be obtained on application to the Publications Branch of the Dominion Department of Agriculture, should be carefully studied by all prospective planters.

For many years a limited distribution of trees, shrubs, and tree seeds was carried on each spring from the Experimental Farm at Indian Head, resulting in hundreds of small plantings being made on hundreds of farms widely scattered over the province, and the successful results attained at the Experimental Farm encouraged many farmers to do something along this line on their own farms.

The Federal Government has always been aware of the necessity for encouraging tree culture on the prairies, but it was not until 1901 that a really definite and practical scheme for assisting settlers in this work was put into operation. It was in that year that the first distribution of trees was made under the co-operative scheme of the Forestry Branch of the Interior Department. From a small beginning the distribution of trees from the nurseries at Indian Head and Sutherland now

average about five million seedlings and cuttings each season, half of which are planted in Saskatchewan, and the balance goes to Alberta and Manitoba. Since 1901 the Forestry Branch nurseries have supplied Saskatchewan farmers alone with over 37½ millions of seedlings and cuttings, besides sending out a considerable quantity of tree seeds. As a consequence of this distribution we now find in all parts of these provinces examples here and there of excellent farm shelter belts. Plantations are not always a success. The tree planter on the prairies has to contend with many difficulties even after the proper choice has been made in the selection of varieties. Ultimate success can be attained only by thorough cultivation of the soil both before and after planting, and any neglect which allows a belt to be grown up with weeds and grass soon results in the destruction of the trees.

In connection with farm tree-planting the question of windbreaks to control soil drifting has recently been the subject of considerable discussion. It is obvious that belts of trees would unquestionably tend to lessen the loss from this cause, but unfortunately no data is available which would indicate definitely whether the results would be justified by the expense necessary for establishing such shelter belts on a sufficiently large scale to be really effective. In certain parts of Saskatchewan the soil drifting problem has come to be of a very vital importance. If tree planting is likely to help in the solution of this problem it would be wise to find this out definitely at the earliest possible moment.

It is encouraging to note the greatly increased interest being shown generally in tree culture. The subject is more frequently discussed in the daily press and in all farm journals. The Canadian Forestry Association started a tree planting propaganda and last summer a special tree planting train was operated

in the prairie provinces under the supervision of Mr. Arch. Mitchell, who lectured and gave demonstrations in a very large number of towns and villages. Towns and cities are also devoting more attention to the beautifying of their parks and streets and to encouraging their citizens to improve private property.

It is also very noticeable that commercial nurseries are endeavouring to put a more hardy and suitable class of stock on the market, as they are realizing that they cannot hope to hold business by selling varieties that are not suitable to withstand our severe conditions. It is advisable to secure as far as possible trees from nurseries operating in the prairie provinces. It is not possible in the limits of this paper to discuss all the varieties that can be grown or the best methods of culture, but mention might be made of the great value of the hardy coniferous evergreens for general planting. These evergreens are somewhat slower of growth during the first few years but once established will soon catch up to many of the deciduous kinds such as ash, maple and elm. Their particular value for prairie planting lies in the fact that they require less than a third of the amount of moisture needed by the deciduous kinds, they are green all the year round, one or two rows are more effective as a windbreak than double or treble the number of broadleaf trees and once established they will not be killed out to the same extent by neglect. The varieties most suited are native White Spruce, Jack Pine, Lodgepole Pine and Scotch Pine. On the Indian Head nursery we have shelter belts of these evergreens now twenty feet high which were planted in 1906, or fifteen years growth.

In considering tree planting on the prairies we must always realize that there are many difficulties to contend with and that there are limitations as to the varieties that can be successfully

cultivated. But there is ample evidence to show that with proper treatment there are many kinds of trees and a much larger number of shrubs which when

suitably arranged will enable anyone who so desires to create almost as beautiful home surroundings as can be secured in the more favoured provinces of Canada.

NEWS ITEMS AND NOTES

The Hon. S. F. Tolmie, Minister of Agriculture, left for Great Britain on June 7 for the purpose of renewing efforts to have the embargo removed from Canadian store cattle.

A new Government Creamery erected at Hawkesbury on the straits of Canso, Cape Breton, commenced operations on May 1. It will serve farmers in Inverness, Cape Breton, Richmond and Guysboro counties. This is the third creamery in Eastern Nova Scotia erected and operated by the Government.

Reports from various parts of Nova Scotia indicate that a relatively large number of silos are being erected. In the main, the silage crop, except in the Annapolis valley, will be the O.P.V. mixture, which Professor Trueman of the Nova Scotia Agricultural College staff has done so much to demonstrate and popularize. Oats, peas and vetches as a silage crop may be relied upon in a country with a cool climate such as Nova Scotia possesses.

Dominion Seed Commissioner, Mr. Geo. H. Clark, left Ottawa on May 19 to attend the International Seed Control Conference at Copenhagen, Denmark, June 6 to 10. While abroad Mr. Clark will visit other European countries to study the problems of the export seed trade and the economics of seed production. During his absence Mr. Alfred Eastham will be the Acting Commissioner.

INCREASED PENALTY FOR VIOLATIONS OF THE MIGRATORY BIRDS CONVENTION ACT

An amendment to the Migratory Birds Convention Act increases the penalty for violation of the Act from \$100 to \$300. Section 12 now reads as follows: "Every person who violates any provision of this Act or any regulation shall, for each offence, be liable upon summary conviction, to a fine of not more than three hundred dollars, and

not less than ten dollars, or to imprisonment for a term not exceeding six months, or to both fine and imprisonment."

The following appropriations have been made for buildings at the Ontario Agricultural College, Guelph:—

New Veterinary College.....	\$60,000
New Dairy Building.....	60,000
To complete Students' Residence and Apiary building.....	23,000

The Nova Scotia Agricultural College closing was held on April 14. Thirty-two students received diplomas, twenty-one being awarded the Scholastic diploma and eleven the diploma of the College. Possession of the Scholastic diploma certifies that the student holding the same possesses the necessary qualifications for continuing the course for the B.S.A. degree. Some thirty members of the Provincial Legislature visited the College on graduation day and inspected the various departments and attended the closing exercises. The Hon. R. M. MacGregor, member of the Nova Scotia Government, addressed the graduates.

Representatives of the dairy breed associations waited recently on the Minister of Agriculture and other members of the Dominion Government asking for an extension of Accredited Herd work, and for more effective quarantine regulations. At present about 350 herds of dairy cattle are being tested under the Accredited Herd Plan. The test requires two years for completion. It was intimated that the chief difficulty in the way of extension was the cost of the work.

The Summer School for Rural Leadership will be held at the Ontario Agricultural College, Guelph, from July 25 to August 5. The speakers include: Professor Gifford,

Montreal; Professor Campbell, Springfield, Mass.; Dr. Norman MacLeod, Toronto; Rev. Denzil G. Ridout, Toronto; Rev. R. R. Nicholson, Clarkson; Dr. John Waugh, Rev. Dr. Robertson, Rev. R. B. Ferris, Miss Mabel Taggart, Professors Harcourt, Leitch and Neilson, amongst others.

The programme includes courses on Rural Social Problems, Religious Education, Soil Fertility, and the Home Garden.

The Ontario Department of Agriculture is contemplating the division into two sections of some of the larger counties, such as Middlesex, Grey and Simcoe so as to increase the efficiency of the work of the agricultural representatives. These counties would then have two representatives each. The department has also under consideration the appointment of at least one more representative in the Russell, Carleton and Prescott section. The proposed move depends on whether the local county councils in the districts named are willing to provide the usual office expenses, etc., amounting to \$500 per year.

A most successful live stock meeting in the form of a mock sale of live stock was conducted in Brant county at the farm of Rush Bros., Hatchley, on May 20, under the auspices of the Department of Agriculture

and the Hatchley Farmers' Club. Both buyers and salesmen from the Union Stock Yards were present, including representatives of the U.F.O. commission department. Over forty fat cattle belonging to Rush Bros. were sorted according to grade and sold. After each sale the class was discussed and the reason for difference in price fully explained. In addition to this, local farmers provided dairy cattle, swine and sheep, which classes were discussed by R. Schuyler, Agricultural Representative, Paris, Mr. Templar of Burford and Jas. Telfer of the Live Stock Branch, Ottawa. About seventy-five farmers attended the demonstration.

Mr. S. A. Bedford, who was Deputy Minister of Agriculture for the province of Manitoba from 1912 to 1915, and is now Chairman of the Manitoba Weeds Commission, was recently given the honorary degree of Doctor of Laws by the University of Manitoba. Dr. Bedford assisted in establishing the Central Experimental Farm at Ottawa, and also founded the Brandon Experimental Farm, acting as superintendent for eighteen years. Previous to occupying the Deputy Ministership he filled the position of Professor of Field Husbandry at the Manitoba Agricultural College. The degree conferred upon Dr. Bedford is a well merited tribute to his efforts to promote the agriculture of Western Canada.

APPOINTMENTS AND STAFF CHANGES

DOMINION ENTOMOLOGICAL BRANCH

Mr. Reginald C. Treherne, Entomologist in charge for British Columbia, has been appointed Chief of the Division of Field Crop and Garden Insects. Mr. Treherne entered the service of the Department in 1909 and has since had a wide experience in the work of the Branch. Previous to entering our service he had experience in entomology in the State of Louisiana. Mr. Treherne is a graduate of the Ontario Agricultural College.

Mr. Howard L. Seamans, of Bozeman, Mont., was appointed in April, 1921, to the position of Entomologist in charge of the Entomological Laboratory, Lethbridge, Alta. Mr. Seamans has had special training in field crop work, particularly that relating to cut-worms and grasshopper control. He is a graduate of the Montana State College of Agriculture and for some time occupied the position of Assistant State Entomologist and Instructor at Bozeman.

Mr. Frank C. Hennessey was the successful candidate for the position Artist-Entomology recently advertised by the Civil Service Commission. Mr. Hennessey has had valuable experience in work of this nature. He was employed rather recently by the Geological Survey and is the author of the illustrations in Taverner's "Birds of Eastern Canada." He is a graduate of Albion College, Michigan, where he received special training in biology, which will be of special value to him in connection with his work.

With the object of improving the quality and quantity of live stock in Northern Saskatchewan, C. A. Cook, B.S.A., graduate of Macdonald College, has been appointed Live Stock Promoter for the district by the provincial Department of Agriculture.

Miss Mary Mounce, Vancouver, a graduate of the British Columbia College of Agriculture, has been appointed Extension Assistant, Department of Dairying, University of British Columbia.

THE AGRICULTURAL GAZETTE OF CANADA

Mr. Warren L. Brenton of Brookfield, N.S., commenced work as Inspector of Dairy Products for the Maritime Provinces on May 2, 1921, succeeding Mr. G. B. Pippy, who resigned to take up creamery work in Charlottetown, P.E.I.

Mr. Denis E. Arsenault, B.S.A., of P.E.I., has been appointed Inspector of Dairy Products for Alberta and British Columbia succeeding Mr. P. C. Kidd, who resigned to engage in commercial work. Mr. Arsenault commenced work June 1.

Mr. Joseph Bent, Toronto, Ont., has been appointed Cargo Inspector under the Dairy and Cold Storage Branch. Mr. Bent will be engaged in the work of cargo inspection at Manchester, England.

NOVA SCOTIA

Mr. W. A. DeLong, B.S.A., Guelph, who during the year 1920-21 has been on the staff of one of the Agricultural Schools in Alberta, has been appointed Assistant Chemist at the Nova Scotia Agricultural College. He will devote the major part of his attention to Soil Surveys and College Extension work.

Mr. A. Birch, B.S.A., Macdonald College, has been appointed to the position of Apiculturist for the province of Nova Scotia.

NEW BRUNSWICK

RESIGNATION.

Mr. L. T. Floyd, Provincial Apiarist for New Brunswick, resigned the position on May 31, to accept a similar situation with the Manitoba Department of Agriculture. Mr. Floyd's connection with the New Brunswick Department began in 1917. At that time the apiaries in the province could not begin to supply the local demand. Within the short period of three and a half years, the industry has experienced an amazing expansion and the product of local apiaries is now found on the shelves of nearly every grocer. As Secretary of the New Brunswick Beekeepers' Association Mr. Floyd was instrumental in building up a strong organization.

Mr. Harry Miller, Centreville, New Brunswick, has been appointed Provincial Apiarist to succeed Mr. L. T. Floyd, resigned

June 1. Mr. Miller has been associated at various times with Mr. Floyd in apiary work and, as Provincial Apiarist, his fund of knowledge acquired in seven years' practical experience in successful bee-keeping will make his advice and aid of value to the honey producers.

SASKATCHEWAN

The Department of Agriculture has appointed Mr. E. W. Neely, B.A., to take charge of its new motion picture branch. Mr. Neely, who is farm bred, took two years of post graduate work in agriculture at the University of Saskatchewan and had an experience of five years as public school principal.

Mr. C. E. Thomas of Lloydminster, who has been engaged in dairy promotion and cow-testing work for the Federal Government since 1914, and who is a successful practical dairy farmer with one of the best producing dairy herds in the province, has been appointed by the Saskatchewan government to take charge of cow-testing work in Saskatchewan and enters upon his duties immediately. He will be attached to the dairy branch of the provincial department of agriculture and his appointment marks an important development in the policy of the provincial government for encouragement of the dairy industry of Saskatchewan.

BRITISH COLUMBIA

The British Columbia Department of Agriculture has appointed Messrs. Charles Good and C. W. Traves to be District Poultry Instructors for the lower mainland and for the Interior respectively. Both are ex-service men.

Mr. W. H. Robertson, Assistant Horticulturist in the Lower Mainland District, B.C., has been appointed to the position of Provincial Horticulturist in the Department of Agriculture, Victoria, B.C.

Mr. Robertson, who is a Nova Scotian by birth, graduated from the Ontario Agricultural College in 1911, after which he became identified with the Horticultural Branch of the British Columbia department. He joined the C.E.F. in February, 1916, and was discharged from active service in the fall of 1919.

ASSOCIATIONS AND SOCIETIES

CANADIAN SEED GROWERS' ASSOCIATION

The Annual Meeting of the above Association was held in Ottawa in June. Dr. James W. Robertson, who has occupied the President's chair since the Association was organized in 1904, resigned and Mr. G. H. Clark, Seed Commissioner, was elected President; Vice-Presidents: Dr. C. A. Zavitz, Guelph, Ont.; Dr. M. Cumming, Truro, N.S.; Dr. Robert Summerby, Macdonald College, Quebec. Executive Council: G. H. Clark, L. H. Newman, Dr. C. A. Zavitz, Professor T. J. Harrison, M.A.C., Winnipeg; M. P. Tullis, Regina, Sask.; F. C. Hart, Toronto, and F. N. Savoie, Quebec. Secretary, L. H. Newman, Ottawa.

The report of the Board of Directors indicated that the number of growers of Registered Seed had practically doubled during the year. The Seed Centre idea, which was first launched in 1913, has gradually been developed until at the present time there is quite a number of these centres scattered throughout the Dominion. During the past season a great impetus has been given to the production of Registered Seed in Ontario through the so-called Combined Standing Field Crop and Threshed Grain Competition scheme, inaugurated by the Secretary of Agricultural Societies in Toronto. In each of these competitions Registered Seed of a single variety must be sown and there is required to be at least fifteen competitors. The standing fields are judged as is also the threshed grain, the combined score determining the final award. As a result of this movement there are this year in Ontario over forty new centres established with approximately 1,000 growers. It is the hope of the Association to be able to purchase Registered Seed in carload lots from these centres another year.

Reference was made in the report to the splendid work which was performed by men who had operated seed plots and carried out the work of the Association for twenty consecutive years without a break. The far reaching influence, as well as the material contribution to Canadian agriculture resulting from the work of these men, was commented upon.

According to the report, the demand for Registered Seed throughout Canada is increasing rapidly and organizations are being brought into existence to meet this demand.

It was shown that one of the greatest needs at the present time, especially in the West, was for better facilities for assembling, cleaning and handling Registered Seed in Canada.

Reference was made to the excellent showing made by the seed of members at the last International Seed Grain Exhibition held in Chicago last December. Members carried off championship prizes in Hard Spring Wheat, White Oats, Flint Corn and Peas. In the class for Hard Wheat members took twenty-one prizes out of twenty-five, including the first three. In White Oats North America was divided into six regions. The most important of these was No. 1 as it included Western Canada and the States west of Chicago. There were fifteen prizes offered in this section, all of which were won by our members, except the sixth prize, which went to a Montana grower. In region No. 2, which took in all of Eastern Canada and the Eastern States, there were one hundred entries of White Oats. Mr. B. R. Cohoe of South Woodlee, Ontario, one of the most active members of the Association, carried off first prize. In Flint Corn the Association members took first, second and third prizes, and in Peas first, second and sixth prizes were won. It was shown that much interest is being taken by the United States growers and institutions in Registered Seed and already a substantial trade with that country has been developed. At the last meeting of the International Crop Improvement Association held in Chicago in December last, a committee of three was appointed, consisting of the Secretary of the Canadian Association and two specialists from the United States, to draft a plan of seed registration which would require similar standards in both countries.

PRINCE EDWARD ISLAND AYRSHIRE BREEDERS

At the annual meeting of the Prince Edward Island Ayrshire Breeders' Club it was reported that practically all the members had either had their herds tested under the Accredited Herd plan, or had made application for the test. The following officers were elected: President, B. R. Brown, York; Secretary, M. N. McRae, Charlottetown.

NEW BRUNSWICK FRUIT GROWERS' ASSOCIATION

The annual meeting of the New Brunswick Fruit Growers' Association was held at

Fredericton on March 30. Resolutions were passed recommending the holding of a provincial fruit show in November, and requesting the Dominion Department of Agriculture to arrange for a Dominion conference of fruit growers at the time of the proposed national apple show in December. The following are the officers for 1921: President, W. B. Gilman, Springhill; Vice-President, Bentley F. Peters, Queenstown; Secretary-Treasurer, A. G. Turney, Fredericton.

THE ACADIAN ENTOMOLOGICAL SOCIETY

At a meeting of the Entomological Society of Nova Scotia, held recently in Halifax, it was decided to broaden out this Society into a Maritime one to include the three provinces, Nova Scotia, New Brunswick and Prince Edward Island. The name of the Society was consequently changed from the Entomological Society of Nova Scotia to the Acadian Entomological Society.

ONTARIO DAIRY COUNCIL

An Ontario Dairy Council has been formed for the purpose of linking up the many branches of the dairying industry in this province. Provincial councils will be established throughout Canada and from these bodies the personnel of the National Dairy Council will be selected. The new council will make efforts to improve the quality of the milk produced and remedy sanitary conditions. E. H. Stonehouse of Weston, Ont., President of the National

Dairy Council, is Chairman of the Ontario Council; Vice-Chairman, S. B. Trainer, Toronto; Secretary, J. P. Griffin.

NIAGARA PENINSULA GROWERS LIMITED

The first meeting of the Niagara Peninsula Growers, Limited, the new co-operative organization of fruit growers of the Niagara District, Ontario, was held at Grimsby on May 9. The following are the officers: President, Colonel Roberts; Vice-President, A. A. Craise; Secretary, G. G. Bourne; General Manager, T. J. Mahoney, Stony Creek.

SASKATCHEWAN AYRSHIRE BREEDERS

An organization known as the Saskatchewan Ayrshire Breeders' Club was recently effected to look after the interests of the breed in that province. The President is J. Alston; and the Secretary, H. W. Thomas.

NORTHWEST INTERNATIONAL COMMITTEE ON FARM PESTS

At a meeting of entomologists of the Federal and Western provincial governments held at Regina in April last, at which representatives from Minnesota, Montana and North Dakota were present, subjects of international importance were discussed, the chief among them being Grasshopper Control, Cutworm Control and the Western Wheatstem Sawfly. A permanent body to be known as "The Northwest International Committee on Farm Pests," was organized. Mr. Norman Criddle of the Dominion Entomological Branch, acted as Chairman of the conference.

THE LIBRARY

LIST OF MAJOR PUBLICATIONS RECENTLY ADDED TO THE DEPARTMENTAL LIBRARY, INTERNATIONAL INSTITUTE BRANCH, DEPARTMENT OF AGRICULTURE, OTTAWA.

Diseases of Greenhouse Crops and Their Control, by J. J. Taubenhaus, Ph.D., Chief of the Division of Plant Pathology and Physiology, Texas Agricultural Experiment Station. New York, E. P. Dutton & Co., c1920.

Agricultural Economics, by James E. Boyle, Ph.D., Extension Professor of Rural Economy, Cornell University. Philadelphia, J. B. Lippincott Co., c1921.

The English Flower Garden and Home Grounds, by William Robinson. London, John Murray, 1921.

The Manufacture of Sugar from the Cane and Beet, by T. H. P. Heriot, F.I.C. Lecturer on Sugar Technology, Royal Technical College, Glasgow. New York, Longmans, Green & Co., 1920.

American Rural Highways, by T. R. Agg, C.E., Professor of Highway Engineering, Iowa State College. New York, McGraw-Hill Book Co., Inc., 1920.

The Anatomy of Woody Plants, by E. C. Jeffrey. Chicago, University Press, 1917.

Denmark, A Co-operative Commonwealth, by Frederick C. Howe. New York, Harcourt, Brace & Co., 1921.

History of Co-operation, by George Jacob Holycake. London, T. Fisher Unwin, 1916

Co-operation at Home and Abroad, by C. R. Fay, M.A. 2nd edition. London, P. S. King & Son, 1920.

Principles of Marketing, by Paul Wesley Ivey, Ph.D., Professor of Marketing, University of Nebraska. New York, Ronald Press Co., 1921.

A Chemical Sign of Life, by Shiro Tashiro, Instructor in Physiological Chemistry, University of Chicago.

The Nature of Enzyme Action, by W. M. Bayliss, M.A., D.Sc., F.R.S., Professor of General Physiology, University College, London. 4th edition. New York, Longmans, Green & Co., 1919.

Elementary Household Chemistry, by Dr. J. F. Snell, Professor of Chemistry, Macdonald College. Toronto, MacMillan Co. of Canada, 1919.

Agricultural Botany, Theoretical and Practical, by John Percival, M.A., F.L.S., Professor of Agricultural Botany, University College, Reading. 6th edition. London, Duckworth & Co., 1921.

Elements of Vegetable Histology, by C. W. Ballard, Microanalyst, Department of Health, City of New York. New York, John Wiley & Sons, Inc., 1921.

Evolution of Plants, by Dunkinfield Henry Scott, M.A., LL.D., F.R.S. London, Williams & Norgate, (Toronto, Wm. Briggs), n.d.

Text-Book of Pastoral and Agricultural Botany, by John W. Harshberger, Ph.D., Professor of Botany, University of Pennsylvania. Philadelphia, P. Blakiston's Son & Co., c1920.

Soils; How to Handle and Improve Them, by S. W. Fletcher, Professor of Horticulture, Michigan Agricultural College. Toronto, Oxford University Press, 1920.

Studies in Elementary Agriculture for New Zealand and Australian Schools, by Vincent W. Jackson, B.A., Professor of Botany, Manitoba Agricultural College, with a chapter on BEE-KEEPING, by William Green and a preface by George George, F.I.C., F.C.S., M.R. San. I. Director of Technical Education and Manual Training. Auckland, Christchurch, Whitcombe & Tombs, Limited.

Practical Physics, by H. S. Carhart, Sc.D., LL.D., formerly Professor of Physics, University of Michigan, and H. N. Chute, M. S. Instructor in Physics, Ann Arbor High School. Boston, Allyn & Bacon, c1920.

Tractor Engines, by E. F. Hallock. Cincinnati, American Automobile Digest, 1920.

New Departure Tractor Manual, published by the Engineering Service Department, New Department Mfg. Co., Bristol, Conn., c1921.

Water Power Engineering, by Frank F. Fergusson, C.E. Toronto, Isaac Pitman & Sons, Ltd., 1921.

The Horse in Health, Accident and Disease, by "Darley Matheson," M.R.C.V.S. London, C. Arthur Pearson, Ltd., 1921.

Traite Des Maladies Du Cheval, par A. Benion, revue par Leon Dupas, Veterinaire Militaire. 6eme edition. Paris, Librairie Agricole de la Maison Rustique, 1921.

Origin and Influence of the Thoroughbred Horse, by William Ridgeway, M.A., F.B.A., Hon. D. Litt. Cambridge, University Press, 1905. (Toronto, MacMillan Co. of Canada.)

A Manual for Fox Breeders, by E. H. Rayner. Summerside, P.E.I., published by the author, c1920.

Rabbit and Cat Diseases, by C. G. Saunders, V.S., B.V.Sc., former Professor in Ontario Veterinary College. Chicago, American Veterinary Publishing Co., 1920.

The Portrait Gallery of The Saddle and Sirlain Club, comp. by E. N. Wentworth. Chicago, Union Stock Yards, 1920.

La Pomme de Terre; Le Topinambour, par L. Bretigniere, Professeur a l'Ecole National d'Agriculture de Grignon. Paris, Librairie Agricole de la Maison Rustique, 1921.

The Effect of Certain Agents on the Development of Some Moulds, by K. G. Bitting, M.S. Bacteriologist, Glass Container Association of America. Washington, D.C., 1920.

Rural Social Organization, by Edwin L. Earp, Professor of Sociology, Drew Theological Seminary, Madison, N.J. New York, Abingdon Press, 150 Fifth Ave, c1921.

Sociology, by John M. Gillette, Ph.D., Professor of Sociology, University of North Dakota. 2nd edition. Chicago, A. C. McClurg & Co., 330 E. Ohio St., 1920.

Our Government—A Book for Canadians, by Mabel McLuhan Stevenson. Toronto, George J. McLeod, Ltd., 1917.

The American Home Diet, by Dr. E. V. McCollum, Professor of Chemical Hygiene, and Nina Simmonds, Instructor in Chemical Hygiene, Johns Hopkins University, Baltimore, Md. Detroit, F. C. Mathews Co., 67 Mullett St., 1920.

THE AGRICULTURAL GAZETTE OF CANADA

NEW PUBLICATIONS

DOMINION DEPARTMENT OF AGRICULTURE

Notes on the Cold Storage of Eggs.—Circular No. 30; Dairying and Cold Storage Branch.

Poultry Keeping in Town and Country.—Bulletin No. 89 (Revised), Poultry Division, Dominion Experimental Farms Branch.

Lime in Agriculture.—Bulletin No. 80 (Revised), Division of Chemistry, Dominion Experimental Farms Branch.

NEW BRUNSWICK

Report of the Department of Agriculture, 1920.—Department of Agriculture, Fredericton, N.B.

NOVA SCOTIA

Report of the Secretary for Agriculture, 1920.—The Nova Scotia Department of Agriculture, Truro.

QUEBEC

Enemies of the Garden and Orchard.—Bulletin No. 69, Department of Agriculture, Quebec.

La culture du trefle.—Bulletin No. 14, Department of Agriculture, Quebec.

ONTARIO

Fruit Culture in Northern Ontario.—Circular No. 1, Northern Ontario Plant Breeding Station, Department of Agriculture, Toronto.

Report of the Agricultural and Experimental Union, 1920.—Results of co-operative experiments in agriculture. Issued by the Ontario Department of Agriculture, Toronto.

Report of the Vegetable Growers' Association, 1920.—The Ontario Department of Agriculture, Toronto.

Hints on Submitting Veterinary Specimens for Bacteriological Examination.—Ontario Veterinary College Circular (Special). Issued by the Ontario Department of Agriculture, Toronto.

Sunflowers as a Farm Crop.—Circular No. 35, Ontario Agricultural College. Issued by the Ontario Department of Agriculture, Toronto.

SASKATCHEWAN

Report of the Director of Agricultural Extension, 1920.—Department of Agriculture, Regina, Sask.

The Control of Weeds.—Bulletin No. 63, Department of Agriculture, Regina, Sask.

The Control of Sow Thistles.—Bulletin No. 58, Department of Agriculture, Regina, Sask.

Russian Thistle.—Bulletin No. 64, Department of Agriculture, Regina, Sask.

Kubanka Wheat.—Field Husbandry Circular No. 31, University of Saskatchewan, College of Agriculture, Saskatoon, Sask.

BRITISH COLUMBIA

Goat-Raising in British Columbia.—Bulletin No. 64, Department of Agriculture.

Report of the Director of Elementary Agricultural Education, 1919-20.—Department of Education, Victoria, B.C.

MISCELLANEOUS

Canadian Percheron Stud Book, 1920, Vol. 4.—Compiled by the Canadian National Live Stock Records, Ottawa.

Canadian Belgian Draft Horse Stud-Book, Vol. 1, 1920.—Issued by the Canadian National Live Stock Records, Ottawa.

The Province of New Brunswick, Its Natural Resources.—Issued by the Department of the Interior.

THE AGRICULTURAL PRESS

INDEX TO ARTICLES BY OFFICIALS OF DOMINION AND PROVINCIAL DEPARTMENTS OF AGRICULTURE

The Canadian Countryman, Toronto, Ont

May 14. *Making Cheese on the Farm.* H. H. Dean, Professor of Dairy Husbandry, O.A.C., Guelph, Ont.

June 25. *Things You Want to Know About Concrete.* R. R. Graham, B.A., B.S.A., Lecturer in Physics, O.A.C., Guelph, Ont.

Farmer's Advocate and Home Journal, Winnipeg, Man.

May 4. *Sunflowers vs. Corn.* G. H. Cutler, Professor of Field Husbandry, University of Alberta, and G. F. H. Buckley, Assistant in Forage Crop Investigation.

May 18. *Gopher Destruction in Saskatchewan.* M. P. Tullis, Field Crops Commissioner, Saskatchewan.

Farm and Dairy, Toronto, Ont.

May 5. *Ventilation Systems for Old Buildings.* Geo. W. Muir, B.S.A., C.E.F., Ottawa.

June 16. *Increasing the Capital Value of Dairy Cattle.* A. H. White, Senior Dairy Promoter, Dairy and Cold Storage Branch, Ottawa.

June 30. *Tip Burn of Potatoes.* Geo. Partridge, Experimental Farm, Ottawa.

Farm and Home, Vancouver.

May 5. *Some Quack Theories in Livestock Breeding.* Professor H. M. King, Head of the Animal Husbandry Department, U.B.C.

May 12. *The Three Methods of Marketing Farm Produce.* F. M. Clement, Dean of the Faculty of Agriculture, University of British Columbia.

Farm and Ranch Review, Calgary.

May 5. *British Shorthorn Bulls.* Hon. Duncan Marshall, Minister of Agriculture for the Province of Alberta.

The Nor' West Farmer, Winnipeg.

April 20. *Good Sires—Why Not More?* W. J. Rutherford, Dean of College of Agriculture, University of Saskatchewan.

The Canadian Poultry Journal, Hamilton, Ont.

June, 1921. *How to Cull the Flock for Greater Egg Production.* A. C. McCulloch, B.S.A., New Brunswick Department of Agriculture, Fredericton, N.B.

The Farmer's Advocate, London, Ont.

June 23. *Meat Production the World Over.* W. R. Reek, B.S.A., Assistant Live Stock Commissioner, Ottawa.

The Grain Growers' Guide, Winnipeg, Man.

June 15. *Sow Thistle Control.* George Walton, Manitoba Weeds Commission.

The Saskatchewan Farmer, Moose Jaw.

June, 1921. *Watch for the Better Farming Train.*

Scientific Agriculture, Gardenvale, Que.

June, 1921. *A Bacteriological Analysis and Cultural Test of "Nitro-Bacter Soil Vaccine."* Dan. H. Jones, Professor of Bacteriology, O.A.C., Guelph, Ont.

Experiments in the Control of Rhizoctonia or Black Scurf of Potatoes. J. E. Howitt, Professor of Botany, O.A.C., Guelph.

Apples in the Okanagan. W. A. Middleton, Extension Assistant, Department of Horticulture, University of British Columbia.

La Solution du Probleme de l'Azote. H. M. Nagant, I.A., I.F., Professeur a l'Institut Agricole d'Oka.

The Western Gardener and Poultryman, Winnipeg.

June, 1921. *How and When to Market Eggs.* A. C. McCulloch, Dominion Poultry Branch.

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty, International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE.

GENERAL INFORMATION

- 161.—International Cold Storage Conference at Paris, December, 1919. *Communication from the International Institute of Cold Storage.* 9, Avenue Carnot, Paris, 17.

The International Cold Storage Conference which met in Paris in December, 1919, was held for the purpose of considering the creation of an international organization which would enable every country to benefit in common from the work done by the scientists, economists and manufacturers of every nation, engaged in studying questions relating to cold storage.

The Conference drew up an international Convention text which is to be submitted for ratification to all the Governments interested and which creates an International Cold Storage Institute, with its seat in Paris, in which all countries invited to enter the League of Nations under the conditions laid down by the Treaty of Versailles will take part. In view of the considerable interest taken, under present circumstances, in a rapid development of all applications of cold to the preservation of perishable food-stuffs, the Conference immediately set up a general temporary Conference for the purpose of controlling and directing the new Institute. The latter has elected a provisional Executive Committee to secure its proper working, having as President M. Andre Lebon, late Minister, President of the French Cold Storage Association; Vice-Presidents M. T. de Alvear (Argentina), Plenipotentiary Minister and Envoy Extraordinary for the Argentine Republic; M. H. A. Bernhoff, Plenipotentiary Minister of Denmark in Paris; M. Kamerlingh Onnes (Netherlands), Professor at the University of Leyden; M. Menozzi (Italy), Director of the Royal Higher School of Agriculture, Milan; M. Vesnitch, Minister of the Kingdom of Servia.

From the month of January, 1920, the Institute has arranged for the publication of a *Monthly Bulletin of Information on Cold Storage* issued in 2 languages, English and

French, in which all the scientific, technical and economic documents of the whole world which have come to the knowledge of the Institute are classified methodically. This publication aims at bringing quickly within easy reach of scientists and manufacturers, knowledge of the progress made in all parts of the world.

- 287.—Bacteriology of Egg Powders.—*Feuille d'Informations du Ministère de l'Agriculture*, Vol. XXV, No. 4, p. 6. Paris, Jan. 27, 1920.

At the meeting held on January 6, 1920, by the Academy of Medicine, Paris, the results of the investigations by Dr. A. Satory and D. J. Flament on the microbic flora of dried egg powders as sold in commerce, were published. This flora is important. It is usually aerobic, and includes micrococci which do not liquify, and others which liquify in gelatines as well as members of the *Bacillus coli* group, etc. These powders are contaminated.

The various brands on the market are not sterilized. In the preparation of creams and many dishes, these powders are not raised to a sufficient temperature for sterilization.

CROPS AND CULTIVATION

- 299.—Beneficial Action of Farmyard Manure in Preventing the Injurious Effects of Alkaline Salts in the Soil.—LIPMAN, C. B. and GERICKE, W. F. in *Soil Science*, Vol VII, No. 2, pp. 105-120, Bibliography of 2 works. Baltimore, Md., 1919.

Experiments in pots made in a greenhouse with barley in clay soil with the object of determining the action of farmyard manure on soil to which has been added in different series:—0.3% sodium chloride, 0.3% sodium carbonate, 0.6% sodium sulphate before sowing the first crop and additional quantities at the same rate before sowing the second crop; four successive crops were grown; the manure was applied at the rate of 20 to 160 tons per acre.

The results, estimated according to the weight of the crops, show the protective action exercised by the manure against the alkaline salts present; the action varied with the quantity of manure applied and with the chemical nature of the injurious salt; it also depended on the sum *internal surface of the soil + internal surface of the manure applied*.

More positive results were obtained against sodium chloride and sodium sulphate; in general, they have a practical application of considerable value.

300.—The Influence of Fertilisers on the Botanical Composition of Pastures in the United States.—SKINNER, J. J. and NOLL, C. F. in *Soil Science*, Vol. VII, No. 2, pp. 161-175, 4 fig. 2 pl., Bibliography of 5 works. Baltimore. 1919.

A pasture on loam soil received for 7 consecutive years superphosphate, sodium nitrate, and potassium chloride in a double triangle arrangement of plots with 66 mixtures of fertilisers plus 6 controls; the total amount of fertilisers applied annually was 50 pounds per acre; the plots were 10 feet square and were separated by 2-foot paths; the grass was cut once a year so as to allow natural seeding. The principal forage plants were:—*Poa compressa*, predominant at the commencement, *P. pratensis*, *Phleum pratense*, with smaller proportions of white clover and red clover. At the end of the experiment *Poa pratensis* had become predominant especially in the plots which had received most nitrogen, while *Phleum pratense* was favoured by potash; clover, however, did better in the plots where there was least nitrogen applied.

The soil of the plots receiving well balanced mixture or mixtures containing principally sodium nitrate remained neutral, whilst when no nitrogen, or only a small amount, was applied it became acid; this, however, did not hinder the growth of clover, although in such cases it is favoured by liming.

To sum up, the predominance of a given species of forage plant in a pasture is very probably due to the survival of those species which the fertiliser applied suits best, such fertiliser being possibly at the same time prejudicial to other species.

Investigations on Different Fertilization Questions.—LEMMERMANN, O., in *Arb. Deut. Landw. Gesell.*, No. 297, p. 198, Berlin, 1919.

The results of a large number of different studies on fertilization questions in Germany are brought together in this report.

Eight years' experiments on the effect of fertilization with nitrogen, potash, phosphoric acid, and lime, with and without

stable manure, on the yields of wheat, potatoes, beets, barley, and oats, and on the plant nutrient supplies of a slightly acid loamy sand soil, showed that in spite of the relatively low lime content of the soil, liming had no unusual effect on crop yields and in one case reduced the barley yield. In dry years smaller crops of grain were produced on limed and unmanured soils than on manured and unlimed soils.

Potash on the whole gave only relatively small returns. In the majority of cases phosphoric acid fertilization resulted in decreased crop yields whether stable manure was added or not.

Nitrogen fertilization generally increased crop yields with the exception of potatoes, but its beneficial effect was found to be more certain on winter grain than on summer grain. As a whole the yields in these experiments were higher where stable manure was used than where it was omitted. It was found that treatment with ordinary commercial nitrogenous fertilizers is not sufficient to maintain the nitrogen supply in this soil.

The balance of phosphoric acid was always positive whether the soil was treated with commercial phosphatic fertilizers alone or stable manure alone. The potash balance was negative in all cases whether stable manure was used with potassic fertilizers or not, indicating the necessity for special attention to this feature.

A series of green manuring studies showed that the use of stable manure with green manure produced greater yields than when green manure was used alone. This was attributed merely to the added effect of the stable manure. The use of straw was without apparent effect. Green manuring in the spring produced larger crop yields than fall green manuring. The ploughing under of green manure to depths of from 10 to 11 inches gave better results than ploughing it under to a depth of only 8 inches. Nitrogen in the form of green manure was 45 per cent as effective for beets as nitrogen in the form of sodium nitrate, and was about twice as effective as that in stable manure. The above ground parts of green manure crops were more effective as manure than the roots. Inoculation of the soil for legumes gave no noteworthy results.

In view of the above results a third series of studies on the influence of organic substances on the nitrogen in fertilizers and soil was conducted, and is to be continued.

A fourth series consisted of pot, cylinder, and field studies of different nitrogenous fertilizers. In a comparison of sodium nitrate, ammonium sulphate, lime nitrogen, and ammonium nitrate the best results with oats were obtained with ammonium nitrate, followed closely by lime nitrogen,

while the poorest results were produced by ammonium sulphate. Ammonium nitrate again gave the best results with potatoes, followed by sodium nitrate, and lime nitrogen gave the poorest results.

Comparative field tests on a poor, light sand soil of sodium nitrate, ammonium sulphate, lime nitrogen, nitrogen lime, ammonium nitrate, calcium nitrate, and liquid manure showed that sodium nitrate plus lime produced the best results with oats, while ammonium sulphate, calcium nitrate, and liquid manure each gave better results than sodium nitrate alone. A three-fold application of ammonium sulphate produced the largest total yields. About the same results were obtained with potatoes, except that calcium nitrate did not give as good results as sodium nitrate. Both the lime nitrogen and nitrogen lime gave good results with oats, and the latter gave good results with potatoes.

A summary of field experiments in a number of German provinces to compare sodium nitrate, ammonium sulphate, and lime nitrogen showed that an addition of 26.7 lbs. per acre of nitrogen to loamy sand soil in general produced good results with different crops. Sodium nitrate gave the highest yields in the majority of cases. Lime nitrogen failed only on very light sand soil.

Further experiments established the fertilizing value of urea, urea nitrate, urea calcium nitrate, potash ammonium nitrate, and ammonium chloride. Urea nitrate, urea, and ammonium chloride were especially beneficial to grain crops. No catalytic action of iron oxide was found on the fertilizing influence of lime nitrogen, and the addition of common salt to lime nitrogen and ammonium sulphate was also without effect.

Seven years' cylinder experiments with sodium nitrate, ammonium sulphate, and lime nitrogen showed that on different soils and under different conditions these three fertilizers will have a very variable relative effect upon the same crop. The addition of lime with the three fertilizers was attended by favourable results. The injurious action of an excess of ammonium sulphate on different crops was completely nullified by adding common salt.

Pot experiments showed that lime nitrogen, while less effective than sodium nitrate, is an active nitrogenous fertilizer when applied properly and at the right time. It injured crops when applied as a top-dressing, and was easily leached out in undecomposed form by adding an excess of water. It gave as good results when applied 3 days before seeding of crops as 12 days.

Pot experiments with oats confirmed the good results obtained in field experiments

with some of the new nitrogenous fertilizers, such as ammonium bicarbonate, ammonium sodium sulphate, ammonium chloride, urea nitrate, and urea when compared with sodium nitrate. Pot experiments also demonstrated the injurious action of granulated lime nitrogen to oats. It was found that dicyandiamide is a very undesirable constituent of lime nitrogen, and it is concluded that lime nitrogen to be acceptable as a fertilizer should have at least 70 per cent of its nitrogen content in the form of calcium cyanamide. Ammonification tests of dicyandiamide salts, including dicyandiamidin sulphate and nitrate, showed that these salts were decomposed by bacteria with difficulty, while lime nitrogen and cyanamide calcium carbonate yielded noteworthy amounts of nitrogen. However, the latter fertilizer gave poor results with barley as compared to lime nitrogen.

Studies of the influence of additions of Thomas meal and superphosphate on a neutral soil which did not react to phosphorous showed that where no nitrogen was added better results were obtained with the Thomas meal, which is attributed to the action of lime in the Thomas meal in setting free the soil nitrogen. Neither phosphate exercised any appreciable influence on the action of sodium nitrate, although usually better yields were obtained on the Thomas meal treated soils. Ammonium sulphate on the other hand produced generally higher yields with Thomas meal, except where an excess of ammonium sulphate was applied.

Studies on the influence of time of application on the action of sodium nitrate, ammonium sulphate, and lime nitrogen showed that under all conditions the quality of results obtained with the different fertilizers decreased in the order named. For winter rye the best results were obtained where one-third of the nitrogen was applied in the fall and two-thirds in the spring. It was found to be always advisable to avoid using large quantities of soluble nitrogenous fertilizers on light soil in the fall. Sodium nitrate and lime nitrogen gave the best results with beets when applied before seeding, while with ammonium sulphate time of application apparently made little difference. Relatively late nitrogen fertilization gave good results with potatoes. Top-dressings of lime nitrogen were injurious to summer grains. Sodium nitrate and ammonium sulphate gave the best results with summer grains when applied before seeding or as early top-dressings.

An extensive series of experiments on phosphoric acid fertilization showed little difference in the final average results produced by Thomas meal and superphosphate. Where sodium nitrate was used with these fertilizers the yields were always

greater than where ammonium sulphate was used.

Experiments on three slightly acid soils, two of them productive and one unproductive, showed that the best results were obtained on all three with superphosphate plus calcium carbonate. No relation was established between the citrate solubility of the phosphoric acid of these soils and their apparent phosphoric acid requirements. There was also no relation between the phosphoric acid content of the crops and the reaction of the soils towards phosphoric acid fertilization. In spite of the acid character of the soils the raw phosphates always produced smaller crops than the Thomas meal and superphosphates. The content of phosphoric acid soluble in 2 per cent citric acid solution in the different phosphatic fertilizers, particularly Thomas meal and the raw phosphates, did not give a true indication of their value as sources of phosphoric acid.

It was found that raw phosphates, such as Algerian phosphate, gave considerably poorer results than superphosphate when used with sodium nitrate. Bone meal also gave poorer results than superphosphate, while Wolter phosphate gave approximately the same results. There was no difference between the action of steamed and ground Thomas meal. The action of raw phosphates was considerably improved by the supplementary use of ammonium sulphate or ammonium nitrate, but this favourable effect was nullified by liming. There was no indication that legumes utilize raw phosphates better than cereals.

Seven years' studies of potash fertilization showed that there was considerable variation in the response of different crops to potash applications. Potatoes and summer barley were especially benefited by potash applications, while rather indifferent results were obtained with such crops as wheat, rye, and beans. Spring applications of potash usually gave better results than fall applications. There was little difference in the results produced by 40 per cent potash salts and kainit. The utilization of the potash in different fertilizers varied under different conditions within wide limits. The potash content of crops was almost always increased by potash applications whether the crop was increased or not. It is therefore concluded that the potash content of crops is not a safe indication of the potash requirements of soils.

A number of liming experiments on a slightly acid soil showed that in spite of its acidity the soil did not react to liming. Relatively large applications of caustic lime had no injurious action and the so-called hydraulic lime had no bad effects.

A large amount of tabulated data is appended.

301.—*Researches on the Velocity of Solubility of Phosphoric Anhydride in Basic Slag and Other Phosphates.*—MASCHHAUPT, J. G., in *Verslagen van Landbouwkundige Onderzoekingen der Rijkslandbouwoostation*, No. 23, pp. 57-78. The Hague, 1919.

The result of previous researches suggested to the author the convenience of determining the velocity of solution of phosphoric anhydride, preferably through repeated extractions. Through an adjustment of his own apparatus he could submit to continued extraction the phosphates under study; thus he was able to estimate the rate of solubility of phosphoric anhydride in carbon dioxide solution. The powdery state of the material, however, prevented a constant rate of solubility, but although the method is not strictly scientific, a comparison may be made between the rates of solubility of the phosphoric anhydride of various phosphates.

The results of analysis show that the rate of speed at which phosphoric anhydride, contained in the following materials, is dissolved in carbonated water, decreases in the order in which the materials are here named: Merck's tricalcic phosphate, bone meal, Algerian phosphate, 3 basic slags, 3 basic phosphates and Florida phosphate, another basic slag and "Ceres" agricultural phosphate. These results are rather unusual, because the Algerian and Florida phosphates, which have a minimum solubility in 2% citric acid, have a satisfactory rate of solubility in carbonated water, compared with other phosphates.

The opinion is held at present that the fertilizing power of Algerian phosphate is much lower than that of basic slag, while that of Florida phosphate is almost nil. If, on the contrary, we were to base the fertilizing power on the rate of solubility of the phosphoric anhydride in carbonated water, we should arrive at opposite conclusions and this points to the fact that either the commonly accepted opinion, from certain aspects, is wrong, or the criterion of the velocity of solution, at least as far as carbonated water is concerned, is not sound.

The necessity for fresh and accurate manuring experiments is obvious, and these according to the author, should be made in sand washed with boiling hydrochloric acid in order to eliminate interference from the many unknown factors existing in cultivated soils. Such experiments, apart from determining which would be the best criterion to go by, be it the velocity of solubility, or the solubility itself independently of the former factor, would also serve to throw fresh light on the soundness, or otherwise, of Wagner's method based on the solubility in a 2% citric acid solution of phosphoric anhydride

contained in phosphatic materials compared with that in carbon dioxide solution.

Irrigation of Potatoes.—POWERS, W. L., in *Oregon Agr. Exp. Station Bulletin* 173, pp. 28. Corvallis, Oregon, 1920.

Results of irrigation experiments with potatoes conducted from 1907 to 1919 in eastern and western Oregon are reported. The work included time, rate, and method of irrigation tests, effect of rotation and fertilizers on yields and water requirements, and other miscellaneous tests. Cultural methods and field practices found profitable in producing the irrigated crop are described briefly.

Rainfall for the growing season, April 30 to October 1, was 5.5 in., and the average evaporation about 24 in. for the period. The Willamette silt loam on which experiments were conducted has a maximum capillary water content of about 34 per cent, an optimum moisture content of about 24 per cent, and a wilting point of about 14 per cent. The minimum moisture content under field conditions is 10 or 11 per cent.

Irrigation gave a higher seasonal soil moisture content, and this was associated with higher yields, an average of 222.2 bushels being produced with irrigation as compared with 122 bushels without irrigation in a 7-year trial. Two irrigations proved better than the same amount applied with one heavy irrigation for potatoes. Most economical returns were secured with light frequent irrigations providing a uniform moisture content, three 1-in. irrigations applied 10 days apart giving a yield of 38.6 bushels to the acre-inch.

The authors found that the best time to irrigate potatoes on this particular soil was when the moisture content in the first foot dropped to the 20 per cent point in percentage dry weight.

Potatoes have yielded most economical returns when the depth of water applied per season was 6 in. in wet seasons and 2 or 3 in. in dry seasons, while the maximum yields of tubers have been produced with 3 or 4 in. in wet seasons, and 6 in. in dry seasons. Application of 9 in. depth decreased the yield below that obtained with 6 in. of irrigation.

Water cost of dry matter or water requirement under field conditions is said to have been greatly reduced by the use of a moderate amount of irrigation. Water requirement varied about the same as the most economical return per acre-inch, and increased above the most economical yield per acre-inch. Potatoes on irrigated legume sod possessed a water requirement about 25 per cent below that of potatoes on dry farmed legume sod land.

The tests indicated that water requirement can be greatly reduced in irrigation farming by practising a good rotation, including legume crops, by using good varieties, by maintaining a good state of fertility and tilth, by irrigating at just the right time in the proper amount, and by practising good general farm methods.

Proper irrigation did not injure the palatability or marketability of potatoes, and it decreased the percentage of culls. Twelve years' irrigation has had little appreciable effect upon soil acidity or the content of available plant food. Soil temperature was lowered by irrigation more than by shading, or above 3° in the surface soil of potato plats. Heavy irrigation caused a higher proportion of vines to tubers, increased the moisture content of the potatoes, and, as shown by analyses reported, decreased the starch, protein, and other constituents except fat. Differences in palatability were very slight.

In central Oregon experiments, potassium sulphate increased the yield per acre-inch from 24.5 bushels on untreated to 39 bushels on treated land. In eastern Oregon experiments, irrigation of 5 to 9 in. depth an acre has given the best results in several of the potato producing sections, and frequently the best returns have been obtained with 6 to 8 in. total depth in 2 or 3 applications.

318.—On Some Attempts to Cross-Pollinate Peas and Beans.—BACH, S., in *Zeitschrift für Pflanzensuchtung*, Vol. VII, No. 1, pp. 73-74. Berlin, June, 1911.

Castration of 10 flower-buds of the pea variety "Victoria;" 7 of them were artificially fertilized with pollen of *Vicia Faba*, 3 were not treated, all were protected with parchment paper covers. After 48 hours the stigmata were cut off 3 of the pollinated flowers, fixed in Fleming's solution, and embedded in paraffin. The 7 flowers left were kept for eight days in their paper bags, when they produced pods from 1 to 2 cm. long, and from 0.4 to 0.6 cm. wide; the pods were seedless, and soon dried and fell off.

Microscopic examination of the stigma showed that only some of the pollen grains had produced a pollen tube, which was very short, 10 μ . at most, and was unable to penetrate the tissues of the stigma itself.

We have here the corroboration and cytological explanation of the negative results which attended Gartner and Tschermak's hybridising attempts. The small seedless pods were of parthenogenetic formation.

The impotence of the pollen of *Vicia Faba* might be explained, the author thinks, by the want of special chemical stimuli

required for the growth of the pollen tube and for enabling it to penetrate.

205.—**Linseed: The Influence of Geographic Origin and Variety on the Composition of the Oil; Investigations in the United States.**—RABACK, F., in *U.S. Department of Agriculture Bulletin* No. 655. 16 pp. Washington.

For 2 consecutive years 4 varieties of selected flax—C.I. (Cereal Investigations) No. 3, Damont (North Dakota 1215)—C.I. No. 2, Primost (Minnesota No. 25)—C.I. No. 13 (North Dakota Resistant No. 114)—C.I. No. 19 (Russian)—were grown in districts of Montana, North Dakota, Wyoming, South Dakota and Oregon differing greatly in climatic and soil conditions. Oil was extracted from the seeds thus grown and a determination made of the colour, specific gravity, refraction, acidity, saponification and iodine indices, and drying properties.

To determine the yield of oil of the seeds, extracting was done with ether, and to obtain samples for finding the physical and chemical constants, cold pressure was used.

The following conclusions, shown in a series of tables, were reached from the results of the analyses:

Varieties of linseed which have different agronomic properties show also different physical and chemical properties in their oils. These properties keep up in a very marked manner from one year to another. The yield of oil changes both with variety and with locality. The specific gravity, refraction index and colour cannot be so easily correlated with the variety and locality. A direct relationship appears to exist between the drying properties of the soils on one hand and the specific gravity, acid index, iodine index and colour on the other hand. Oils having at the same time a strong acidity and high specific gravity, and also a relatively high iodine index, dry more rapidly, forming a solid film. Oils of lighter colour invariably dry more rapidly.

LIVE STOCK AND BREEDING

220.—**A Contribution to the Study of Anaplasmosis in Cattle: Sheep and Goats are Susceptible.**—LIGNIERE, J., in *Bulletin de la Societe de Pathologie exotique*, Year XII, No. 9, pp. 641-651. Paris, Nov. 12, 1919.

Inoculation experiments with *Anaplasma argentinum* on several species of animals showed that:—

(1) The guinea pig, rabbit, pig and horse do not seem to be affected by *A. argentinum*.

(2) Sheep and goats, on the contrary, are receptive to the parasite, which remains alive in the blood for years.

(3) The passage from sheep to sheep or from one goat to another is possible indefinitely.

(4) The inoculation with *A. argentinum* of sheep or goats never gives rise to symptoms or lesions of anaplasma, or to typical parasites visible in the red blood corpuscles; the temperature is not altered, except sometimes about the 30th day, when a rise to 40-41° C. may be found for 1 or 2 days only; even during this passing fever, when it exists, nothing abnormal is observed about the animal, and the blood colourations do not reveal *Anaplasma* as such; the parasite, however, exists in the red corpuscles, as proved by inoculation, but the author thinks it is to be found there in so small a form that it is difficult to recognize.

(5) The blood of sheep and goats previously inoculated with *A. argentinum* is active when injected into cattle which take anaplasma infection; there is a possibility of attenuating the *A. argentinum* in the sheep and of using their blood as a vaccine against bovine anaplasmosis.

335.—**Prophylactic Inoculation of Cattle Against Foot and Mouth Disease.**—LUTRARIO, in *Office International d'Hygiène publique, Bulletin mensuel*, Vol. XI, Part 3, pp. 266-272. Paris, March, 1919.

The problem of immunising cattle against epizootic foot and mouth disease has always been the object of keen attention of the Department of Public Health in Italy. That Department began by making practical use of all that was generally known of the pathogenesis of epizootic foot and mouth disease in relation to immunity.

It is known that an attack of foot and mouth disease naturally or artificially caused is immediately followed by a state of immunity of longer or shorter duration. Consequently, cattle for slaughter shipped by sea from an infected area, and thus with the disease in incubation, are first inoculated at the port of embarkation; as soon as they are well they are disinfected and shipped, with the certainty that they will not develop the disease on the journey. The advantages of this method were proved by the inoculation carried out at Salonica in 1911 on Serbian cattle imported into Italy, by those made at Naples and Castellammare on cattle sent to Libya in 1915, etc.; however, this application does not constitute a sure method from which great results can be expected in the prophylaxis of epizootic foot and mouth disease. For this reason the Department of Public Health has relied on wide research in the matter of immunity against epizootic foot and mouth disease.

In 1914 work was commenced entrusted to a special Committee which after became a ministerial Commission consisting of (1)

THE AGRICULTURAL GAZETTE OF CANADA

Professor Alfonso Di Vestea, of Pisa University, President. (2) Professor Achille Scavo, of Sienna University. (2) Professor Alessandro Lanfranchi, of Bologna University. (4) Professor Camillo Terni, Co-Director of the Experimental Station for infectious cattle diseases at Milan. (5) Professor Mori, Director of the Experimental Station for infectious cattle diseases at Portici. (6) Dr. Angelo Parodi Delfino, of Reggio Emilia. (7) Dr. Carlo Bisanti, Veterinary Inspector General. (8) Professor Alfredo Bartolucci, Provincial Veterinary Surgeon attached to the Department of Public Health, Secretary.

Each experimenter uses the well-equipped laboratories of the various Experimental Stations for infectious cattle diseases. Thus, those working in northern Italy use the Milan Station; those working in southern Italy have at their disposal, for want of an Experimental Station, a laboratory specially created at the Royal "Cascina" (Farm) of Poggio near Florence.

The following is a short account of the results obtained during the first 3 years of the research:—

1.—*Immunising method suggested by Professor Terni.* This consists in strengthening and prolonging, by successive inoculations of virus specially prepared and graded, the immunity which the animals have already acquired in consequence of a first attack, natural or artificial, of the disease.

Under these conditions, inoculations with the virus cause a reaction fever without any internal symptoms of the disease and in this way generally, after 3 inoculations, super-immunity is assured against natural infection which lasts during the whole dairy period for milch cows. It is in short a method of vaccination with natural virus which is applied to young animals at an age at which initial infection does not cause sensible harm and when infection is easily dominated and which is continued to such a point that a degree of immunity is obtained guaranteeing the animals against all further natural infection.

This method has been frequently tested in practice; not only have the animals vaccinated been exposed with impunity to natural infection in fields and cowsheds, but quite recently, an outbreak of the disease having occurred in an experimental cowshed in the Milan district, a Station under Professor Terni himself, the vaccinated animals were all ill, to such an extent, that the farmers asked for the practical application of the method on a large scale. From experiments made up to date the following doses may be considered effective:

(A) Intravenous inoculation.—First inoculation of 25 to 50 cc. of hyper-immunised blood (blood taken from oxen saturated

with aphthous virus) according as the animal is young or full-grown. Second inoculation 4 or 5 days later as above with the addition of 25 cc. of a solution containing 1% of filtered virus or 50 cubic cm. of blood of fixed virulence. Third inoculation 8 to 10 days after the second.

(B) Subcutaneous inoculation.—Same inoculation as in the previous case only doubling the dose of hyper-immunised blood.

Principal Theories Resulting from Professor Terni's Work on the Pathogenesis and Epidemiology of Epizootic Foot and Mouth Disease.—(1) The best and surest channel of inoculation is by the digestive organs; the penetration of the virus by other natural channels (either by the skin or by the teats) is always slower and does not cause the appearance of the general symptoms before virus is present in the rumen, the favourite seat of incubation of the virus itself.

(2) The local aphthous lesions are always the first to appear and they are noted as initial even before the fever; by rumination the virulent matter in incubation in the rumen which spreads over the mouth infects locally the epithelial abrasions.

(3) Next appear the apthae in the hind feet, following infection communicated by the dung which may remain unmoved for several days in the lower part of the intestines, especially if the animal is on dry fodder. The apthae in the fore feet develop as a consequence of pollution caused by passing over contaminated litter or by the laver from the mouth of the animal. The evidence from protecting of the feet before infection is in favour of this criterion.

(4) The apthae on the teats originate from local inoculation; the virus, present in the milk when the infection becomes general, collects round the entrance to the lactiferous canal, but at other points the apthae are caused by inoculation by milkers who habitually lubricate the teats with the milk itself. When not milking, the apthae on the teats are due to insect bites, dirty litter, movements of the animal's tail, etc. Careful disinfection of the teats and the hands of the milkmen and the use of antiseptic lubricants reduce the aphthous eruption on the teats to a minimum.

(5) As soon as fever shows, the blood becomes infectious for a short period, but always to a less extent than the liquids in the digestive channels.

(6) Still more important than the injuries observed in the stomachs and in the oesophagus, represented by epithelial abrasions and localized ulcers, in severe and fatal cases of foot and mouth disease, are the injuries to the small intestine especially in the duodenum and the first part of the ileum. The intestinal lesions of foot and mouth disease correspond, in their histo-

logical characters, with those produced experimentally on animals by vaccine inoculated internally and with intestinal lesions of smallpox in man. These intestinal lesions are very frequent and are the cause of late manifestations of infection reducing by about one half the economic yield of the animal. The absorption of apthous virus in fatal cases depends on special conditions of the digestive tube, and these conditions depend in turn on excessive bulky food.

(7) The so-called re-infections at short intervals are only relapses depending, generally, on disorders of the digestive organs. Bacterial fermentation in some cases, renders the first attack of the disease abortive and hinders the production of a state of immunity, thus giving rise to true re-infections; however, a natural immunity to the disease exists and lasts for about 8 months.

*Results Obtained in the Experimental Cowshed of Poggio at Caiano (Florence).—*On other lines than those followed by Professor Terni, the experimentors of the Commission are at present engaged on attempts to find a practical method of immunisation against foot and mouth disease.

In the experimental cowshed of Poggio at Caiano (Florence), to which is attached a laboratory furnished with all necessary apparatus, a Station under Dr. Cosco, Veterinary Inspector General, assisted by Dr. Aguzzi, Provincial Veterinary Surgeon of Florence, facts of considerable importance have been ascertained.

It has been possible to obtain precise evidence of the characteristic properties of the blood of animals suffering from the disease with regard to the virulence of the serum and of the red globules. These properties of the blood of apthous animals (unknown or obscure previously) may be summarized as follows:—

The blood of apthous animals is virulent during the whole period of fever.

The red globules and the serum of the blood of animals attacked are virulent.

The red globules after many washings in large quantities of sterile physiological solution to eliminate all trace of serum, cause infection by subcutaneous inoculation of cattle even with a dose of 1 cc.

Further research has in addition established the following:—

(1) Intro-venous injection of virulent blood corpuscles (obtained from producing animals after a series of passages until a severe clinical form is present, and after a minimum period of incubation of about 70 hours) does not cause the disease unless a certain dose is exceeded, which, in the case of the animals used in the experiments (of various breeds, aged from 12 to 18 months), is about 30 cc.

(2) An excellent dose for use in the first treatment of cattle is 25 cc; in the second treatment it may be raised to 30 cc. and in the third treatment even to 45 cc.

(3) The vaccination is followed by the typical reaction represented by a rise in temperature showing itself 1 or 2 hours after the injection and rarely later. This reaction lasts several hours (8 to 10 hours and sometimes longer) and is repeated on the following days in a less degree for several successive days (2nd, 3rd reaction). This thermal reaction is accompanied by generally very slight discomfort (flatulence, horripilation, muscular trembling) sometimes scarcely noticeable and, occasionally, non-existent. Generally, the thermal reaction is less marked in the 2nd treatment and is often insignificant in the 3rd.

(4) A period of 10 days should elapse between the treatments. A shorter interval may cause, at least in certain cases, a development of the disease after the 2nd treatment.

(5) Two animals which had never had foot and mouth disease, given 3 treatments according to the method indicated above, and exposed 4 months later to infection in a cowshed where there were cattle suffering severely from foot and mouth disease caused by natural infection, showed absolute resistance, while control animals were attacked in 48 hours by a severe form of the disease.

338.—The Use of Naphthalene as a Remedy Against Chicken Lice.—ABBOTT, W.S., in *Journal of Economic Entomology*, Vol. XII, No. 5, pp. 397-402. Concord, N.H., Oct., 1919.

The author has experimented with various preparations of naphthalene as a means of destroying chicken lice of the species *Menopon biserialatum*, *M. pallidum*, *Lipeurus heterographus* and *Gonicotes abdominalis*. The naphthalene used for dusting in the feathers a powder containing 5% of naphthalene is ineffective, but a powder containing 10% is very effective; it causes, it is true, slight discomfort but this is quite temporary and after 5 to 10 minutes the fowl no longer feels any ill effects.

By thoroughly rubbing powder containing 60 to 100% of naphthalene into the feathers there is risk of killing the fowls; on the other hand, powders of the same strength lightly dusted over the feathers cause no permanent injury.

A suitable method for reducing considerably the number of lice consists in sprinkling finely powdered naphthalene over the fowls when they are roosting at night; but this method requires further testing.

Balls of naphthalene placed in the nest had no effect in diminishing the number of lice on the hen setting or laying there, but they injured the hens and prevented them

from setting well and seemed to have a toxic effect on the eggs and newly hatched chicks.

339.—Eradication of the Depluming Mite of Chickens by One Treatment.—WOOD, H. P., in *Journal of Economic Entomology* Vol. XII, No. 5, pp. 402-404. Concord, N.H., Oct. 1919.

The author has reported that the pluming mite of chickens (*Cnemidoptes gallinae*) can be completely eradicated by a single treatment of one of the following:—

Lime-sulphur bath: 1 pound of lime + 2 pounds of sulphur + 1 gallon of water dilute the mixture in 20 parts of water.

Tobacco sulphur bath: 3 teaspoonfuls of "Black leaf 40" tobacco extract + 6 ounces of sulphur + 2½ gallons of water.

Arsenical bath as used for destroying ticks in cattle.

Sodium fluoride and sulphur bath: ½ ounce of sodium fluoride + 2 ounces sulphur + 1 gallon of water.

Sodium fluoride, sulphur and soap bath: ½ ounce of sodium fluoride + 2 ounces sulphur + sufficient soap to make the water soapy + 1 gallon of water. This bath destroys not only the depluming mite but the lice.

Kerosene emulsion is effective against the parasite but is injurious to the fowl treated.

224.—Results of Crossing the Zebu with European and Australian Cattle, in British and Dutch India.—T'HOEN, in *Cultura, Officiel Organ van het Nederlandsch Genootschap voor Landbouwwetenschap*, Year XXXI, No. 374, pp. 369-374. Wageningen, Nov. 1919.

In tropical colonies, repeated attempts have already been made to cross *Bos taurus* with the zebu, so as to combine the beef-producing capacity and productivity of the former with the adaptability of the latter to the local conditions and its special resistance to disease.

The author describes the results of a series of crosses between the Neelore breed of zebu on the one hand and the Java ox and some European and Australian cattle on the other hand.

The zebu of Neelore (Madras, British India) is an excellent working animal; it measures 4.6 to 4.9 feet at the withers; the female gives a high yield of milk, 1.8 to 2.2 gallons per day with a fat content of 4.5 to 5 per cent. From the cross zebu × Java cattle draught types were obtained but they were poor milkers. By crossing Neelore zebu with Australian or Dutch cattle, animals were obtained which gave a good production of beef and a milk yield which, although less than that of their European dams, was nevertheless above that of the

zebu, and such as to make these hybrids of great value in the warm damp coast regions of the Dutch East Indies. The fat content of their milk is 4% and even over. The castrated males make splendid draught animals; the author mentions a pair (sold on the Malang market) which measured each 4.9 ft. in height and 7.2 ft. round the chest.

By using as sires, in these crosses, males of European breed, the zebu characteristics quickly disappear, and in the 3rd generation the progeny cannot be distinguished from pure-bred European cattle.

The importation of bulls and dairy cows from India, Europe and Australia is regulated by the State. The European and Australian types concentrated in the central mountainous territory, where the altitude moderates the temperature and keeps it between 15° and 30° C., can become acclimatized and breed regularly.

The results already given by scattered and unco-ordinated attempts promise the best of prospects for the future, especially when the work is carried on according to a uniform method and with a well-planned programme of work.

The example of British India gives an idea of the results that can really be obtained by the crosses in question. The Montgomery (Zebu) cow has been mated with the Ayrshire bull, with a view to raising the milk yield of the zebu type. While the Montgomery cow yields on an average 1.8 to 2.2 gallons of milk per day, at the second generation of the cross a daily yield of 3.3 gallons has been attained.

229.—The "Maoilin" Breed of Cattle in Ireland.—MITCHELL, S. L., in *Hoard's Dairyman*, Vol. LVII, No. 11, p. 551. Fort Atkinson, April 4, 1919.

The Irish "Maoilin" breed of cattle, hornless, with dark brown yellow coat, generally whole coloured, sometimes spotted white on the head and shoulders, is very ancient and at the present time there are only 8 or 9 herds.

According to some writers, the native home of this breed stretches east of the Shannon through Longford, Westmeath, Kings County and Tipperary; at the present time it is found chiefly in the west part of the island from Donegal to Cork. The distinctness of the breed is shown by the fact that, however much crossed, it is dominant and recognizable even to the 10th generation. It is due to this fact that the breed is not to-day entirely extinct. A society has been formed for re-establishing this breed.

"Maoilin" cows are excellent milkers; they give from 8 to 10 gallons a day in

summer and 4 or 5 gallons a day in winter of delicious rich milk. They are not liable to any disease. According to the author the hornless character of some of the present Scotch and English breeds may be due to cattle introduced into East Anglia and Scotland by early Irish colonists.

230.—**Inheritance of Quantity and Quality of Milk Production in Dairy Cows.**—CASTLE, W. E., in *Proceedings of the National Academy of Sciences of the United States of America*, Vol. V, No. 10, pp. 428-434. Washington, October, 1919.

In 1911, Mr. T. J. Bowlker undertook, at his farm in Framingham (Massachusetts), an experimental study on a large scale of inheritance in dairy cows by the modern method of crossing pure breeds and looking for a combination, in the 2nd cross generation, of the characters differentiating the breeds used in crossing. The breeds which he selected for trial were the Holstein-Friesian (which surpasses all others in the quantity of milk produced) and the

Guernsey, which is distinguished for the quality of its milk. He started with the idea that, if the quantity and quality of milk production were independently inherited characters, it should be possible to combine them in a single breed by crossbreeding in accordance with Mendel's laws. The experiments were continued at Framingham up to 1919, and will be carried on by the University of Illinois.

The Holstein cows were mated with a Guernsey bull and the Guernsey cows with a Holstein bull. Altogether, between 1912 and 1919, 140 F₁ calves were produced; by mating F₁ heifers with F₁ bulls, 35 living F₂ calves were obtained, all vigorous and well grown. The F₁ cows calved for the first time at a slightly earlier age than the cows of either pure breed, which is evidence of their vigour and early maturity.

The following data have been taken from the tables showing the milk and butter-fat production for the first and second lactation periods of the pure bred cows and of those crossbred:—

Milk and butter-fat production of cows of pure Holstein and Guernsey breeds and of cows bred by crossing them.

1ST LACTATION PERIOD

Breed	Number of cows	Average age at calving	Average quantity of milk produced	Percentage of butter-fat	Average quantity of butter-fat produced
		Years	Lb.		Lb.
Holstein.....	25	2.8	7,673	3.4	261
Guernsey.....	8	2.7	4,617	5.0	230
F, crossbred.....	31	2.6	6,612	4.08	270

2ND LACTATION PERIOD

Holstein.....	20	4	9,475		322
Guernsey.....	8	3.8	5,593		280
F, crossbred.....	13	3.9	8,663		363

In the first lactation period, and still more in the second, the F₁ crossbred cows gave results superior to the mean between the results given by the pure breeds producing them both as regards the quantity of milk and fat. But the record of variations relatively to the mean in the case of F₂ of milk production are transmitted by independent factors; in that case it should be possible to combine them and to obtain inheritance transmission.

The two reciprocal crosses differed very slightly, and inversely in the two lactation periods; it seems, therefore, unlikely that any sex-linked factors are concerned.

RURAL ECONOMICS

357.—**Important Factors in the Cost of Producing Wheat.**—BOSS, ANDREW, in *Journal of Farm Economics*, Vol. I, No. 3, pp. 85-89. Lancaster, Pa., October, 1919.

For something over two years the importance of wheat production has been emphasized and kept before the world, first by agitation for a guaranteed price for wheat during the war and second by more or less serious attempts to determine the cost of producing wheat.

It is, therefore, important to know the factors of cost in wheat production and to

find out how costs can be reduced or eliminated.

The factors of cost in present-time wheat production in the spring wheat growing section of America may be classified in the order of importance as follows: Labour (man and horse), land, seed, machinery, threshing costs, general expenses and cost of twine. Fertilizer cost or values consumed is just as legitimately a cost as any of the preceding items, but no one has as yet devised a satisfactory basis for determining what this cost is. No charge is commonly made, therefore, for soil fertility consumed in producing a wheat crop except where commercial fertilizers or manures have been purchased for cash.

Labour costs.—The cost for man and horse labour constitutes the largest item of cost in wheat production. It was found to be 41.4 per cent of the total cost in Minnesota during the years 1913-1917. With increasing wages for man labour and much higher feed cost for horse labour than prevailed during that period, the labour cost now assumes an even greater proportion of the total. The opportunity for reducing the man labour cost lies in efficient management. The average hours of man labour required in Minnesota were found to be 12.3 and of horse labour 29.9. Some farmers are able to reduce the amount to 10 hours or less of man labour and 25 hours of horse labour, by the use of large implements and effective methods. The cost of producing an acre of wheat would be, therefore, considerably less than the average. The rate paid for man labour is a factor of importance in the aggregate cost of an acre of wheat, but it is little subject to variation during the season. The rate of horse labour, however, may be controlled to a considerable extent by the kinds and amounts of foods fed and especially by the number of hours of labour performed annually per horse.

The land factor.—Land is one of the largest factors in wheat production. Not all land is suited to wheat production. Climate also affects the growth and influences greatly the yield and quality of the wheat and ultimately the cost of producing it. Land that will grow wheat and that is favourably located as to climate is limited, and is becoming increasingly more expensive.

It is much more difficult to grow wheat profitably on \$200 land than on \$100 land. It has been estimated that to secure the same percentage of profit on investment on \$100 land as on \$25 land, a yield more than 4 times as great must be obtained. The charge for the use of land may be computed from one of two bases. It may be charged at rental value where cash rent is paid or the rental value can be otherwise deter-

mined. Or the charge may be made up of the items of cost, which are interest of the investment in land, taxes, upkeep of drains, fences and other land improvements. Where the values are affected by proximity to a large city or market with a strong demand for town lots or where values are greatly affected by speculation, as is now the case in the north central area, the rental value is perhaps the safest basis.

In normal times when values fluctuate less widely, the interest on investment basis is quite satisfactory. In determining the interest charge prevailing, prices of land exclusive of buildings should be used and interest figured at the rate at which money may be borrowed on well-secured farm loans.

In cost of production studies in Minnesota (1913-1917), the cost for the use of land was calculated to be \$4.60 an acre or 28.2 per cent of the total cost. Land values have since risen and present costs are much larger. There is no way to reduce this cost per acre in wheat production except to grow wheat on cheaper land. The bushel cost could of course be reduced by increasing the yield, provided the increase can be secured without corresponding increase in other expenses.

Seed cost.—The seed cost of wheat is determined by the quality and quantity used and the market value. The seed cost in Minnesota, from 1913 to 1917, was 11.4% of the total cost of growing an acre of wheat.

Machinery cost.—Machinery plays a large part in wheat production. In fact it is because the wheat crop can be so well handled by machinery that it is so popular with farmers. It is difficult to determine accurately the cost for machinery for specific crop where so much of the machinery is purchased and used for all crops in common.

The charge for the use of machinery is made up of depreciation, interest on investment, repairs and oils, labour for repairs and care of machinery.

Depreciation may be roughly calculated at 10 per cent per year though in studies made in Minnesota, the record depreciation over a long period of years was found to be only 7.3 per cent. There is a wide difference in rate of depreciation for different machines and also on different farms.

In order to charge machinery values correctly it is necessary to determine the acre cost of each machine and distribute it to the various crops concerned. The cost for machinery has greatly increased during the past two or three years owing to the increased price of new machines, the increased cost of labour and repairs, and other expenses of maintenance.

This increase is estimated to be 60 to 75 per cent. The cost for machinery in pro-

ducing wheat in Minnesota, 1913-1917, was found to be 8.1 per cent of the total cost.

Cash threshing Cost, General Expense and Twine.—The minor costs in wheat growing are composed of the cash cost for threshing which is about 5.2 per cent of the total, general expenses 4.3 per cent and cost of twine for binding 1.3 per cent.

AGRICULTURAL INDUSTRIES

361.—Experimental Study of Electro-Purification of Milk.—ANDERSON, A. K. and FINKELSTEIN, R., in *The Journal of Dairy Science*, Vol. 11, No. 5, pp. 374-406, 2 fig. Bibliography of 8 works. Baltimore, Sept., 1919.

The principle of the process of electric purification of milk (electro-pure process) consists in heating the milk by means of a high voltage electric current, and then cooling it.

The apparatus consists of a receptacle for the milk, of a heater in which the milk is heated to 40° C. by steam, of a supply tank for the electric purifier, of a hot milk tank acting as reservoir to the cooler and of a cooler.

The electro-pure machine itself consists of several units, varying in number according to the quantity of milk to be treated. Each unit is composed of a series of 5 porcelain cups. The milk is distributed to the cups by a tap leading from a box-shaped distributing tank. The first cup of each series has about twice the capacity of the other cups. The cups of each series are arranged so that the milk entering the first cup will drain into the second cup, which is placed slightly forward and below the first; when the second cup is filled, the milk overflows by a lip into the third cup, and so on to the last cup of the series. In each of the smaller cups, which have a capacity of about 200 cc. is placed an electrode in the form of an insulated rod terminating in a copper disc. This disc is about the size of the inside of the cup and when in place is very near the bottom of the cup. When the machine is in operation the circuit is completed by the stream of milk, which by its electrical resistance is raised from 40° C. (the temperature on its entrance into the machine) to 70° C. (the temperature when it passes out). An alternating current is used. In the machine illustrated in the accompanying figure the voltage is 2,300, the amperage is 14 and the frequency is 25. The three phase system is used.

With electric current costing 5 cents per kilowatt-hour, the cost of working is \$2.74 per hour for a machine with 6 units, which treats 5,000 pounds of milk per hour, exclusive of the cost of the preliminary heating to 40° C.

As the literature on the subject of the efficiency of electrical treatment of milk furnishes but few data, the authors have dealt with the subject by making a series of careful experiments, the results of which lead to the following conclusions:—

The "Electro-pure" process produces a very satisfactory reduction in the total number of bacteria contained in good raw milk and a satisfactory reduction in the bacteria contained in poor raw milk, and at the same time it destroys effectively nearly all lactose fermenting endopositive organisms contained in raw milk.

Milk issuing from the different units of the "Electro-pure" machine contains a fairly uniform number of bacteria.

Electro-treated milk kept at 5-10° C keeps well for about 5 days. At ordinary temperature it shows no change in 24 hours but sours normally in 48 hours.

The destruction of bacteria in the electric purifier is due to the heat produced rather than to the electric current itself. The electric purifier furnishes a means of producing a very sudden high temperature for a short time.

Heating to 70° C. by means of the electric purifier causes:—Little or no precipitation of albumin; no modification in the quantity of cream which separates on standing; apparently no destruction of the peroxidase, but a weakening in the reductase; no modification in the feeding value of the milk. On the other hand, such treatment increases sensibly the time required for coagulation by rennin. In the experimental plant which was used by the authors, the electric purifier, after long use, was not entirely satisfactory, modifications in construction are required before the machine can be considered a commercial success.

259.—Experiments in Preserving Eggs in Italy.—PASSERINI, M., in *Bollettino della Societa italiana per lo studio dell'alimentazione*, Vol. I, No. 1-5, pp. 23-30. Florence, 1919.

From the results of a series of experiments conducted in 1918 at the Scandicci Agromatic Institute (Florence), the author concludes that:—

(1) Eggs may be preserved dry for over 7 months, provided they have been taken very fresh, carefully washed, have had their shells lightly rubbed with fat (lard) containing 1% of salicylic acid, and have been kept in a cool dry place. The loss in weight, due mostly to the evaporation of moisture through the shell, amounted to only 5% in 231 days.

(2) By wrapping each egg thus greased in oiled paper, the loss in weight may be reduced to less than 3% in 231 days. In

both these cases the eggs keep their taste and smell almost unaltered and the albumen remains liquid in the same way as eggs preserved in lime water.

(3) Immersion in lime water gave excellent results; with perfectly fresh eggs, carefully washed, and sufficiently pure lime, like that from statuary marble, this method is good for keeping eggs, in a cool place, for 14 months. The slight taste of lye which eggs preserved in ordinary lime water take on in the course of time probably depends, not on the penetration of small quantities of lime into the interior of the eggs, but on impurities in the lime, especially alkaline hydrates, as this taste is not found in eggs preserved in sufficiently pure lime water. Some writers think that the liquefaction of the albumen is due to the passage of small quantities of calcium hydrate into the interior of the egg, but the author's experiments show that, even with dry preserving, this occurs. Hence it probably depends on a molecular change in the albumen in time and perhaps also on the beginning of hydrolysis of the albumen concerned.

Partial sterilization at 60°C., before immersion in lime water did not give good results.

(5) Dry-preserving of eggs previously heated to 60° C. and placed in closed vessels gave disastrous results, whether these eggs were or were not coated with fat or gelatin. The same results followed when the eggs were exposed to ether vapour. Probably better results would have been obtained by placing the eggs in containers sterilized by heat, but in order to keep the contents from further taint, difficulties would have been encountered which were too un-surmountable in practice.

PLANT DISEASES

366.—Modification in the Sulphate of Iron Treatment for Controlling Chlorosis of Woody Plants.—ARNAUD, G., in *Revue de Viticulture*, Year XXVI, Vol. LI, No. 1325, pp. 325-330. Paris, November 20, 1919.

Results of experiments carried out in May-June and at the end of September in the Jardin de la Station de Pathologie vegetale in Paris, on pear trees and Carolina poplars attacked by chlorosis. These were the only plants attacked by chlorosis available to the author; but he is of opinion that the results obtained by him are applicable to vines similarly attacked.

The suggested method is as follows:—Holes 1.5 cm. to 2 cm. deep are made in the trunk or large branches with a punch; by means of a syringe the holes are filled with a paste made by mixing 35 to 40 gm. of finely powdered sulphate of iron with 20 gm. of olive oil.

The treatment, made preferably in spring, only acts on those parts of the plant which are above the hole.

The treatment in question has the following undoubted advantages over the treatment formerly used, which consisted in placing crystals of sulphate of iron in the holes: Certainty in effect, at least on the trees experimented with (pear, Carolina poplar), rapidity of action (the trees become green again in a marked degree in a week), and persistency of greenness; moreover, the treatment is very quickly done and economises sulphate of iron, as the syringe fills the holes almost without any waste. However, the method described has disadvantages which are absent from the model method of painting freshly cut surfaces with a 20% to 30% solution of sulphate of iron. The chief drawback appears to be the weakening of the trunk and branches in which the holes are made, especially in the case of young plants not provided with props. Also the addition of oil increases the cost of the treatment; but as inferior olive oil and various vegetable oils would probably be just as effective and the quantity used is small the cost of the treatment should not be much.

370.—Keeping Bean Seed Until it is Old as a Means of Controlling Bacterial Blight of Beans. (*Bacterium Phaseoli*).—RAPP, C. W., in *Science*, New Series, Vol. L, No. 1303, pp. 568. Lancaster, Pa., Dec. 19, 1919.

In the course of research on the bacterial blight of beans (*Bacterium Phaseoli* E.F. Sm) at the Oklahoma Agricultural Experiment Station in the United States, it was noticed that the most effective method hitherto evolved for eliminating the disease is the use of old seeds in sowing.

To test this fact, the infected seed obtained from experimental plots at the above-mentioned Station was collected each year and stored. Beans 4 and 5 years old have never produced plants attacked by bacterial blight, but the percentage of germination has been so low as to prevent their use under actual farming conditions. Seed 2 and 3 years old—with one exception ascribed to accidental infection—have given plants free from bacterial blight.

Results obtained, show that the use of seed 2 and 3 years old furnishes plants free from *Bacterium Phaseoli*, when planted in uninfected land and at a sufficient distance from other areas cultivated under beans, to insure the impossibility of accidental infection. Such seed, moreover, has a sufficiently high percentage of germination to make its use practical under actual farming conditions.

Fungicidal Dust for the Control of Smut.—MACKIE, W. W., in *Science*, Vol. 52, No. 1353. Garrison-on-Hudson, N.Y., 1920.

After calling attention to the injury to seed grain from the customary treatments with formaldehyde and copper sulphate solutions, which is said to be greater in arid regions than in humid ones because of the more frequent rupturing of the seed coats of the grain during threshing, the author gives an account of experiments with Little Club wheat treated with solutions and dust preparations of fungicides.

The experiments were repeated from 2 to 9 times and the average effect on germination and smut occurrence was tabulated. The grain was treated with formaldehyde, copper sulphate, and copper sulphate and lime solution, and with dust preparations of copper carbonate, copper sulphate, copper sulphate and calcium carbonate combined, and copper sulphate and lime dusted separately. Two ounces of the dust per bushel of seed was required.

Row plantings were made, the seed harvested and threshed, and the percentage of smut determined. Very favourable results were obtained by the use of the dust fungicides. Copper sulphate dust when mixed with equal parts of calcium carbonate controlled smut attacks due to seed-borne spores without damage to germination. Copper carbonate dust was equally effective. The dusts were all said to adhere well to the grain.

Common Scab of Potatoes.—*Gardeners' Chronicle*, Vol. 67, No. 1736. London, England, 1920.

Information here presented is credited to a preliminary report of trials carried out at the University of Leeds by W. A. Millard.

Scab occurs mainly on light sandy or gravelly soils, an outstanding feature of which is that they are usually poor in organic content. The treatment which has met with best success on such soils consists in adding considerable quantities of green organic matter shortly before or at the time of planting. In these experiments no stable manure was used, since it was found that the grass itself possesses a high manurial value. A mixture of artificial fertilizers was used, however, including sulphate of ammonia and sulphate of potash, each at the rate of 2 cwt. per acre, and superphosphate of lime at the rate of 4 cwt. per acre. It is not suggested that treatment of the kind described is applicable to potato planting on a large scale, in which case probably other means must be adopted, such as ploughing in a green crop.

263.—Investigations on the "Crown Rust" of Oats (*Puccinia Coronata*), in Iowa, United States.—MELHUS, I. E., and DURRELL, L. W. in *Agricultural Experiment Station, Iowa State College of Agriculture and Mechanic Arts, Botany and Plant Pathology Section, Research Bulletin*, No. 49, pp. 115-144. Ames, Iowa, 1919.

In certain years *Puccinia coronata* Corda, restricts the production of oats in Iowa in a marked manner. It is noticed that this rust shows itself epidemic one year while in the following year the disease is reduced to very small limits. Up to the present time the various factors which influence the growth, development and epidemiology of this rust had not been definitely studied.

From research carried out by the authors during 3 years it has been proved, firstly, that the minimum temperature for the germination of the uredospores of *P. coronata* is 1°C., the optimum temperature 17-22°C. and the maximum temperature 35°C. The optimum temperature for growth of the germ tube is 20°C. The germination of the uredospores produced in the greenhouse is variable. In some experiments less than 5% of them germinated; in others a germination percentage of 90% was obtained. The average of the percentage for all the experiments at the optimum temperature was 21.9%.

It is essential for the uredospores of *P. coronata* to be in direct contact with water in order to germinate. A saturated atmosphere does not furnish sufficient moisture for germination. Uredospores floating on a film of water germinate better than those immersed in water and for this reason heavier infection may be obtained when the uredospores are blown on to moistened plants than when they are applied in suspension in water.

Ordinary tap water used in the experiments carried out by the authors was found to be noticeably toxic to the germination of the uredospores. Vaseline and paraffin oil in contact with water act as stimulants to the germination of uredospores. Vaseline increased the percentage of germination by 23% over the controls, while paraffin increased it by 70% under the conditions of the experiment. The environment in which the uredospores of *P. coronata* are produced influences their germination to a certain degree. Uredospores borne on heavily infested seedlings do not germinate so well as those borne on plants approaching maturity. A still, humid atmosphere favours rapid maturation of the uredospores. Uredospores detached from the host plant and kept in a dry capsule at a temperature of from 13° to 20°C. showed increased germination after 6 or 7 days. The biological form of "crown rust" which lives on oats, has as alternative hosts, *Rhamnus catharticus*

and *R. lanceolata*, which is one of the most widely distributed native species. *R. frangula*, *R. caroliniana* and *R. alnifolia*, according to the data collected, do not serve as hosts in the intermediate stage (aecidium) of the biologic form of "crown rust" which is found on oats.

R. lanceolata grows generally in the southern half of Iowa and in many localities the bushes are within a short distance of the oat fields.

R. cathartica is commonly used as an ornamental shrub on lawns and in public gardens. It bears annually the aecidium of crown rust and may well constitute one of the means of annually renewing infection.

There are in Iowa two native species of *Rhamnus* (*R. lanceolata* and *R. alnifolia*) and two introduced species of (*R. cathartica* and *R. frangula*).

In the United States there are at least 10 native species of *Rhamnus*. However, it is only in a few cases that their relationship to crown rust of oats has yet been established.

INJURIOUS INSECTS.

274.—The Influence of Temperature and Other Physical Agencies on the Insecticidal Properties of Chloropicrin (1).—BERT-RAND, G., BROCC-ROUSSEAU and DASSON-VILLE, in *Comptes rendus des seances de l'Academie des Sciences*, 2nd Half Year, 1919. Vol. CLXIX, No. 22 (Dec. 1, 1919) pp. 1059-1061. Paris, 1919.

According to the place and climatic conditions, the activity of chloropicrin when used as a parasiticide is liable to be affected by the temperature and degree of moisture in the air. The authors have studied these circumstances and also the possible influence of light. Their experiments were mainly concerned with weevils, but were extended to other insects.

These investigations have demonstrated that in the use of chloropicrin against insects there is no need to trouble about the influence of light or shade or of the degree of humidity in the air, as these circumstances are without effect. On the other hand, temperature very materially increases the speed of action of the insecticidal vapour as in the case of chemical reactions. Hence in practice it is very important to raise, where possible, the temperature of the places where chloropicrin is being used for the destruction of insects.

The Leafhopper as a Potato Pest. PARROTT, P. J., in *New York State Station, Technical Bulletin* 77, pp. 3-18. Geneva, N.Y., 1920.

The author records observations on the seasonal activities of *Empoasca mali* Le

Baron, and reports upon field and cage experiments conducted with a view to determining its relation to potato culture and means of control. A summary of these has been noted from another source.

Migration of overwintering leafhoppers to potato plantings began during early June, and the vines were sought for purposes of oviposition as soon as they appeared above the ground. Eggs were deposited largely in the young tender leaves near the growing tips of the plants, and oviposition continued until the plants were killed by frosts during early October. With the hatching of the nymphs all stages of the pest were present on the vines during the growing period. The disorder attained its greatest intensity during August. At this period nymphs and adults of the second generation of the leafhopper became increasingly abundant, and intermingled with them were individuals of the different stages of the first generation. Feeding by both nymphs and adults was attended with injuries to leaf structures.

277.—The "Lucerne Grub" (*Colaspidea atrum*) Injurious to Vegetable and Garden Plants, in France.—MURATET, H., in *Comptes rendus des seances de l'Academie d'Agriculture de France*, Vol. V., No. 38, (Dec. 10, 1919), pp. 970-972. Paris, 1919.

Besides the considerable ravages it occasions in fields of lucerne, *Colaspidea atrum* may cause appreciable damage in gardens and vegetable plots.

On June 26, the author noticed that the larvae of this coleopteron had overrun a garden situated at Blagnac, near Toulouse. They were found in large numbers on several plants which they had partly eaten, especially on the leaves and stems of potatoes, beans, parsley and on marguerite heads. The author then collected some of these larvae and fed them on the plants just named. He found that they attack preferably first the outer flowers of the marguerite (the tubular flowers in the centre remain intact), then leaves of beans, which were almost entirely destroyed, then parsley, only the stalks of which were devoured, the leaf blades remaining untouched. Finally, leaves of potatoes were least attacked.

The garden was between two fields of lucerne and this invasion of *C. atrum* took place after the young shoots of the second crop of lucerne in these fields had been mostly eaten up. It is therefore probable that the "grubs" had emigrated to the garden because their usual food had run short.

To reach the garden the grubs had to cross a vine but they had not attacked it. The author tried also to feed them on vine leaves, but without success.

(1) See also *Agricultural Gazette*, Nov., 1920, p. 920.

THE INTERNATIONAL REVIEW OF AGRICULTURAL ECONOMICS

The following is a brief indication of the contents of the more important articles in the January-February, 1921, number of the *Institute Economic Bulletin*. Persons interested in any of the articles may obtain the original Bulletin on application to the Institute Branch, Department of Agriculture, so long as the supply for distribution is not exhausted.

Miscellaneous Agricultural Co-operative Societies in Germany During the War.—9 pages. This article covers the general development during the war of a considerable group of agricultural co-operative societies varying in number and character. The sources of the capital of these societies and the work done by them are dealt with and a detailed statement of their profits and losses is given.

The International Conference of Agricultural Syndicates.—4 pages. This is a report of the Conference held at Paris in November, 1920. The fundamental principles and rules of the International Confederation of Agricultural Syndicates, as adopted by the Conference, are given in detail.

Live Stock and Hail Insurance in Switzerland in 1918.—6 pages. A description of these companies and the conditions under which they work is given, as well as a statement of their working during 1918 and previous years.

Profit Sharing in Agriculture in Great Britain.—22 pages. The case for profit-sharing is first discussed. The different types of profit-sharing are enumerated, and descriptions of a number of schemes at present in existence and of some abandoned schemes are given. The article then takes up in detail the bases of profit-sharing and gives the outlines of a model scheme of profit-sharing in agriculture.

The Agricultural and Economic Development of Brazil.—22 pages. Deals with the principal agricultural products, the raising of live stock, industrial activity, foreign trade, roads and means of communication, and the banking system.

Some of the shorter articles are: German Agricultural Co-operation in Czecho-Slovakia in 1920; The Training of Managers of Agricultural Societies at the National Agricultural Institute of France; Agricultural Co-operative Societies in Posen; Agrarian Reform in Poland.

THE CO-OPERATIVE SYSTEM IN AGRICULTURE IN THE CZECHO-SLOVAK REPUBLIC

The basis of the agricultural co-operative system in Czecho-Slovakia has been supplied by the Savings and Reserve Associa-

tions, styled "Raiffeisensky," which offer an unlimited guarantee. The first two of these institutions date back to 1890. Other agricultural associations (limited companies) followed, such as the Purchasing Unions, which buy the requirements of their members wholesale, and co-operative institutions for the purpose of utilizing and selling agricultural products. Co-operative dairies have been found very advantageous, especially in Moravia. The distilleries, starch factories and potato-drying plants on the co-operative system have greatly suffered during the war. As a specialty, may be mentioned the co-operative drying sheds for succory, in which the root is dried prior to being worked up into chicory. Co-operation in flax growing is now passing through a period of stagnation, while similar organizations for the exploitation of fruit and vegetables have only been started. One of the most important branches is that of co-operative storage of corn which relieves the farmer from the anxieties connected with dealing in this commodity. The Millers and Bakers Co-operative Societies supply him with cheap flour and bread in exchange for corn. Some difficulty has been experienced in the working of the Cattle Dealers' Co-operative Societies, though they have proved most useful in Moravia and Silesia, particularly in improving the breed. Co-operative Societies for the supply of electricity in towns and country districts exist throughout the republic, two of the largest of the kind being in Drazice, Bohemia) and Verovany (Moravia); the one at Hradec Kralove (Bohemia), which supplies about 22 districts, running a close third.

The Co-operative Societies, anxious to extend the system still further, have among themselves combined into Co-operative Unions or Centres, which take over any surplus stock of the societies, arrange for credit, make purchases on a large scale, audit accounts, etc.

Besides the "Raiffeisensky" there exist in Bohemia "Selfhelp" Societies under the style of "Agricultural District Loan-offices," which arose through amalgamation of the former contribution funds into one district establishment. They are supplying working capital on credit and grant credit on mortgage. In Moravia and Silesia the business is confined to the lending of the capital in hand, deposits not being accepted.

The co-operative system in Slovakia and Carpatho-Russia is developing much more slowly. Slovaks and Ruthenians, with the help of the Central Union in Prague, have founded a "Central Association" at Bratislava and "The Country Co-operative Union" at Uzhorod, which are extending the system in both countries.

THE AGRICULTURAL GAZETTE OF CANADA

AGRICULTURAL STATISTICS

AREAS OF THE 1921 CEREAL CROPS

WHEAT

Countries	1921	1920	Average 1915 to 1919
	Acres	Acres	Acres
Belgium.....	305,000	306,000	.....
Bulgaria..... (a)	2,481,000	2,064,000	2,125,000
Spain.....	10,357,000	10,255,000	9,912,000
France..... (a)	12,138,000	11,370,000	11,206,000
Alsace-Lorraine.....	310,000	288,000	226,000
Finland.....	20,000	19,000	18,000
Scotland..... (a)	56,000	70,000	76,000
Italy.....	11,491,000	11,290,000	11,224,000
Luxemburg.....	27,000	27,000	25,000
Norway.....	41,000	41,000	26,000
Poland..... (a)	1,569,000	1,656,000	.....
Roumania:			
Former Kingdom..... (a)	2,788,000	2,017,000	4,202,000
Bessarabia..... (a)	546,000	896,000	568,000
Bukovina..... (a)	23,000	21,000	.....
Transylvania..... (a)	1,289,000	1,478,000	.....
Czecho-Slovakia..... (a)	1,428,000	1,411,000	.....
Canada.....	18,654,000	18,232,000	16,343,000
United States.....	56,744,000	57,192,000	57,873,000
India.....	25,087,000	29,727,000	30,806,000
Algeria.....	2,782,000	2,648,000	3,179,000
Morocco.....	1,462,000	1,997,000	1,551,000
Tunis..... (a)	1,236,000	1,334,000	1,439,000
Totals.....	150,834,000	154,339,000	.....

(a) Winter wheat only.

RYE

Countries	1921	1920	Average 1915 to 1919
	Acres	Acres	Acres
Belgium.....	523,000	523,000	.....
Bulgaria..... (a)	404,000	383,000	396,000
Spain.....	1,771,000	1,800,000	1,850,000
France..... (a)	2,052,000	1,959,000	1,989,000
Alsace-Lorraine.....	110,000	108,000	88,000
Finland.....	605,000	603,000	589,000
Italy.....	297,000	282,000	280,000
Luxemburg.....	20,000	20,000	20,000
Norway.....	36,000	37,000	46,000
Poland..... (a)	6,872,000	.....	.....
Roumania:			
Former Kingdom..... (a)	125,000	158,000	183,000
Bessarabia..... (a)	157,000	129,000	401,000
Bukovina..... (a)	32,000	39,000	.....
Transylvania..... (a)	186,000	162,000	.....
Czecho-Slovakia..... (a)	2,209,000	2,225,000	.....
Canada.....	698,000	650,000	358,000
United States.....	4,544,000	5,043,000	4,831,000
Totals, less Poland.....	13,769,000	14,121,000	.....

(a) Winter rye only.

THE AGRICULTURAL GAZETTE OF CANADA

BARLEY

Countries	1921	1920	Average 1915 to 1919
	Acres	Acres	Acres
Belgium.....	91,000	90,000	90,000
Bulgaria.....	414,000	392,000	394,000
Spain.....	(a) 4,227,000	4,319,000	3,670,000
France.....	(a) 357,000	346,000	285,000
Alsace and Lorraine.....	121,000	118,000	98,000
Italy.....	544,000	494,000	526,000
Luxemburg.....	5,000	5,000	6,000
Norway.....	156,000	156,000	125,000
Roumania:			
Former Kingdom.....	(a) 72,000	33,000	116,000
Bessarabia.....	(a) 5,000	2,000	.....
Czecho-Slovakia.....	(a) 27,000	27,000	.....
Canada.....	2,456,000	2,552,000	2,343,000
United States.....	7,713,000	8,083,000	8,155,000
Algeria.....	2,519,000	2,444,000	2,870,000
Morocco.....	1,955,000	2,341,000	2,034,000
Tunis.....	1,013,000	934,000	1,209,000
Totals.....	21,675,000	22,336,000	.....

(a) Winter barley only.

OATS

Countries	1921	1920	Average 1915 to 1919
	Acres	Acres	Acres
Bulgaria.....	(a) 11,000	11,000	14,000
Spain.....	1,553,000	1,588,000	1,270,000
France.....	(a) 1,849,000	1,833,000	1,715,000
Alsace and Lorraine.....	255,000	252,000	210,000
Italy.....	1,186,000	1,159,000	1,152,000
Luxemburg.....	62,000	62,000	61,000
Norway.....	342,000	343,000	329,000
Canada.....	15,295,000	15,850,000	13,122,000
United States.....	44,829,000	43,323,000	42,452,000
Algeria.....	554,000	574,000	575,000
Tunis.....	148,000	150,000	153,000
Totals.....	66,084,000	65,145,000	.....

(a) Winter oats only.

Reviewing the totals in the preceding tables, it appears that acreage in wheat has decreased by 3,505,000, and acreage in rye has decreased by 352,000, in barley by 661,000, but that the acreage in oats has increased by 939,000. The increase in oats is compensated by the decreases shown in the totals for rye and barley taken together. So there remains the net deficit in wheat acreage of 3,505,000.

In accounting for this decrease, a great factor is the large decrease for India of 4,640,000 acres, with a corresponding decrease in production of 112,000,000 bushels. In so far as Europe is concerned, the countries for which data are given in the table show an increase of 1,660,000 acres. The three States of Northern Africa show a decrease of about 500,000 acres, while the increase in Canada nearly compensates for the decrease in the United States. The rye acreage in Europe is about the same as last year, the chief loss in the world's acreage occurring in the United

States which by so much strengthens the wheat situation.

The supply and demand prospects in the coming new grain year are not unfavourable, especially for North America. It is true that Argentina and Australia still have large surpluses to market, but elsewhere old stocks are small, and exceptionally so in North America. The small crop in Russia, accompanied by severe drought in the East, places Russia rather in the importing than in the exporting class, and India will have to carefully conserve her supplies in order to avert famine.

Under the present conditions of demand, limited in purchasing power and through compulsory economy, the world's crops of the present season may be sufficient for absolute needs, but, with demand conditions similar to those prevailing before the war, there probably would be a considerable shortage in supply even should Canada exceed her present promise of a production of 300,000,000 bushels.

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FOREIGN CROP PROSPECTS, JUNE 20, 1921

The condition of the cereal crops, as a whole, is generally satisfactory throughout the northern hemisphere. In the United States harvesting of winter wheat is under way. There is some anxiety on account of hot weather, especially in Nebraska. In the spring wheat States the outlook continues very favourable.

In Europe the outlook is favourable, the desired rains having fallen in the chief countries.

In the United Kingdom prospects are favourable but more rain is needed for spring sown grain. In France numerous falls of warm rains have improved the crops, and the wheat crop generally is quite satisfactory. In Denmark the crop prospects are still considered favourable though rain is urgently needed. In Sweden the weather has been exceptionally dry but, in general, not much harm has been caused so far.

Very favourable reports have been received from Germany, and wheat and rye promise well. The agricultural situation is generally very favourable in Italy, and there is every expectation that this year's crops will produce much more than those of 1920. In

Spain the condition of the crops is generally considered satisfactory.

According to the *Pravda* of Moscow, the grain yield of Soviet Russia is put at only 70,000,000 bushels as against an expected crop of 260,000,000. Severe drought is reported to be prevailing in East Russia. In Roumania, beneficial rains have been general, and the condition of the crops is good. In Jugo-Slavia the crops are satisfactory but rain is needed.

In North Africa the condition of the crops is still considered good, although suffering from excessive moisture.

The weather is seasonable and cold in Argentina, and favourable for ploughing and sowing. According to an official statement the surpluses remaining for export on May 31st were: wheat 80,000,000 bushels, corn 146,000,000 bushels, and linseed 22,500,000 bushels.

Good rains are reported to have fallen over the pastoral and agricultural districts of West Australia, and also in other important wheat growing areas of the Commonwealth. Conditions are generally favourable for sowing.

UNITED STATES JUNE CROP REPORT

The United States Department of Agriculture gives the following estimates of area and production of crops in the United States in 1921, the estimated production being

based on condition on June 1st. The final estimates for 1920 and the average of the five years 1915-19 are given for comparison.

Crops	Area			Production		
	1921	1920	Average 1915-19	1921 Based on Condition, June 1	1920	Average 1915-19
	Acres	Acres	Acres	Bushels	Bushels	Bushels
Wheat.....	56,744,000	57,192,000	57,873,000	830,000,000	787,128,000	830,895,000
Oats.....	44,829,000	43,323,000	42,452,000	1,405,000,000	1,526,055,000	1,432,697,000
Barley.....	7,713,000	8,083,000	8,155,000	191,000,000	202,024,000	208,098,000
Rye.....	4,544,000	5,043,000	4,831,000	71,000,000	69,318,000	69,159,000
Hay.....	73,842,000	73,181,000	.....	Tons 101,000,000	Tons 108,233,000	.....

THE WHEAT CROP IN INDIA

The yield of wheat in British India in 1921 is estimated at 253,000,000 bushels against 364,895,000 in 1920, and an average of

345,743,000 for the previous five years, or 69.3 per cent and 73.2 per cent of the two last mentioned yields respectively.

THE FLAX FIBRE SITUATION IN EUROPE

(From *The Daily News Record*, New York, May 9, 1921.)

According to a statement by W. H. Webb, President of the Irish Linen Society, the Irish farmer who suffered heavy losses from low prices last year sowed this year only 5 per cent of the average acreage to flax fibre. By 1922 the acreage sown to flax fibre will have diminished to the vanishing point.

The Dutch, Belgian and French farmers have done better this year than last and yet with their increased acreage only one-third of the average flax acreage has been planted this year.

THE WHEAT CROP OF ARGENTINA

(*The U.S. Market Reporter*, May 7, 1921)

Argentina occupies a particularly important position in the world's wheat markets, as it is third in the list of great exporting countries, with prewar average annual exports of 95,000,000 bushels. However, it is only eighth among the producers, with a prewar average crop of 157,000,000 bushels. Export shipments from the new crop begin about February 1st, after the heavy movement from countries of the Northern Hemisphere is past.

Argentina and Australia are in the same class in the latter respect. India is not quite the same, for harvest is later in the part of India from which the exports come. Harvest in Argentina begins the latter part of November and continues throughout December and January and is concluded early in February. Harvest in Australia begins the first week in December and laps over a few days into February, while harvest in British India begins about March 1st and continues until the middle of May.

In considering the crops and exports of Argentina and Australia it simplifies the proposition to think of January as the harvest month; for then the crop year, the export year, and the calendar year all correspond.

Argentina is a more consistent producer than Australia or India, not being subject to the rather frequent long periods of drouth that cause crop shortages in those countries.

Argentina first began to attract attention in the markets of the world in 1893, when a crop of 58,000,000 bushels of wheat was harvested. The area sown was 3,095,000 acres. Although the area steadily increased this yield was exceeded only once, and then by only a few hundred thousand bushels, until 1899. During the intervening years Argentine agriculture went through the usual new-country or frontier experiences of only "scratching the soil" and enduring the minimum of transportation and marketing facilities.

In 1899 Argentina harvested 105,000,000 bushels of wheat on 7,900,000 acres and exported 63,000,000 bushels. Then, for the first time, the country was placed securely on the wheat map of the world and became

an important factor in the world's markets. The area sown took another jump in 1902, and increased over 50 per cent more in 1905. The area sown in the autumn of 1905 was 14,020,000 acres and by 1908 had increased to 14,980,000.

The peak of Argentina's increasing wheat acreage was reached before the war in Europe began, when in the autumn of 1912 an area of 17,100,000 acres was sown. This was followed by a decline of 1,000,000 acres during the next five years, until in 1917 the area sown was 16,090,000 acres. Then followed, if the figures are correct, an enormous jump to 17,875,000 acres sown in the autumn of 1917. But the two following seasons saw a rapid decline to almost the exact acreage sown in 1908, namely, 14,960,000 acres.

The area sown last year for the harvest of January, 1921, is estimated at 14,820,000 acres, which is below the 5-year pre war average. Yet the 1921 crop, which is officially estimated at 184,000,000 bushels, is far above the pre war average.

Since Argentina's crop reached 100,000,000 bushels in 1899, it has fallen below that total only three times, twice when the acreage was still small. In 1917 there was less than half an average yield for the acreage, as the production was but 80,000,000 bushels on a seeded area of 16,090,000 acres. Since 1903 the country has been a very consistent producer, with crops of 130,000,000 to approximately 190,000,000 bushels. Only twice it has fallen below that minimum, while in 1920 it exceeded 200,000,000 bushels. Since the area seeded reached 10,000,000 acres the annual exports have ranged from approximately 90,000,000 bushels as the minimum, except in two years, to a little above 135,000,000.

The average production, exports and other crop features of the 5-year period before the war, 1909-13, are summarized as follows:—

Average production (bush.)	157,000,000
Average exports (bush.)	95,000,000
Average retained (bush.)	62,000,000
Average area sown (acres)	15,800,000
Average yield per acre (bush.)	10

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MANCHURIAN WHEAT EXPORTS FOR 1920

Exports of Manchurian wheat from the port of Dairen, Manchuria, during the year 1920 amounted to 14,684,549 bushels, compared with 1,641,380 bushels during 1919

and 971,338 bushels during 1918. The total exports of Manchurian wheat from Dairen during 1920 with the countries of destination were as follows:—

Destination	Quantity	Destination	Quantity
	Bushels		Bushels
Singapore, Straits Settlements.....	158,860	Belgium.....	188,409
Port Said, Egypt.....	7,239,629	Italy.....	721,978
Great Britain.....	2,235,473	Chosen (Korea).....	34,122
Denmark.....	427,856	Japan.....	3,591,902
Netherlands.....	1,867	United States.....	84,453
			14,684,549

LIVE STOCK STATISTICS

Classification	Dec. 1, 1920	Dec. 1, 1919	Increase (+) or decrease (—)	
			in number	percentage
Horses (1).....	3,581,380	3,465,234	+ 116,146	+ 3.4
Cattle.....	16,789,844	16,317,329	+ 472,515	+ 2.9
Sheep.....	6,139,299	5,340,527	+ 798,772	+15.0
Swine.....	14,149,462	10,517,875	+ 3,631,587	+34.5
Goats.....	4,451,463	4,139,601	+ 311,862	+ 7.5
Rabbits.....	6,840,541	7,677,816	— 837,275	—10.9
Poultry.....	60,751,686	51,021,698	+ 9,729,988	+19.1

(1) Exclusive of army horses.

Classification	1920	1919	Increase(+) or decrease(—)	
			in number	percentage
Horses (1).....	205,162	161,619	+ 43,553	+26.9
Cattle.....	1,487,361	1,285,956	+ 201,405	+15.7
Swine.....	976,643	770,205	+ 206,438	+26.8

(1) Horses employed in agriculture.

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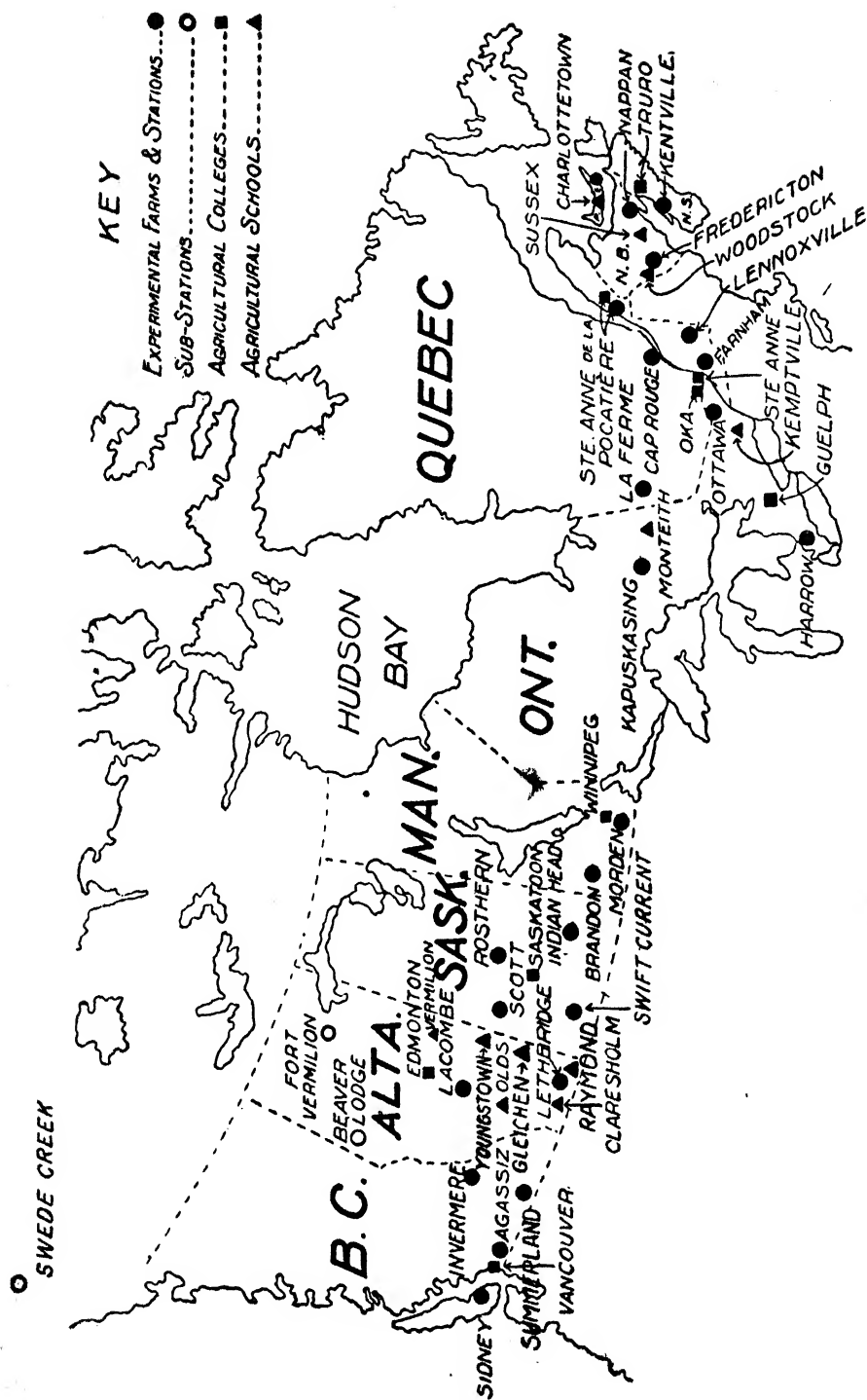
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OF CANADA

Issued by the Dominion Department
of Agriculture, Ottawa



MAP OF CANADA SHOWING THE LOCATION OF FARMS, STATIONS AND SUB-STATIONS IN THE EXPERIMENTAL FARMS SYSTEM, THE AGRICULTURAL COLLEGES AND AGRICULTURAL SCHOOLS

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J. B. SPENCER, B.S.A., Director of Publicity.

THE CANADIAN CASE AGAINST THE BRITISH CATTLE EMBARGO

Presented by the Honourable S. F. Tolmie, Minister of Agriculture, before the Royal Commission of Inquiry on the Cattle Embargo in Great Britain

IN presenting the case for Canada before the Royal Commission of Inquiry on the Cattle Embargo it is desired to express appreciation for this and other opportunities of urging, on behalf of the Government of Canada, redress of what the Dominion believes is an injustice. For many years the Government of Canada has protested against the maintenance of this embargo.

Until the cattle embargo was enforced Canadians enjoyed the privilege of shipping store cattle to Great Britain. Shipments were prohibited, however, after the imposition of the embargo, on the assumption that contagious pleuro-pneumonia had been discovered in a consignment of Canadian cattle landed in Great Britain. At that time the diagnosis of the British official veterinarians was stoutly denied by Canadians and also by prominent British Veterinarians, and the fact that not a single case of contagious pleuro-pneumonia has occurred in Canada, at that time or later, is an indication that the diagnosis made by the official veterinarians was incorrect, and that a grave injustice was done to the cattle breeders of Canada.

Canada, at the present time, claims that her herds of cattle are as free from disease as are those of any country in the world.

As disease possibilities from Canadian cattle, imported into Great Britain, have been so freely discussed of late, it will be in order to give a brief outline of the organization responsible for the health of Canadian live stock.

The Health of Animals Branch of the Dominion Department of Agriculture consists of a Veterinary Director General, who has charge of the work of the Branch, assisted by an Assistant Veterinary Director General and an adequate staff of qualified Veterinary Inspectors, and these inspectors must be graduates of an approved veterinary college and, in addition, must pass a qualifying examination before being accepted to carry on the work of the branch.

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In addition, and in conjunction with the Branch, research and biological laboratories are maintained. A line of inspection and quarantine stations extends along the American border from the Atlantic to the Pacific. The entry of animals from the United States is limited to certain ports so as to facilitate complete control of the work. The quarantine stations are fully equipped with the necessary buildings and appliances so that a thorough examination of animals entering Canada may be made. The staff maintained in connection with the research activities of the Branch, as well as the staff of the Branch generally, is adequate for the prompt handling of any outbreaks of disease and can be promptly added to in the event of extraordinary measures being necessary.

It is interesting to note that in Great Britain, when speaking of the boundary line between Canada and the United States, it is usual to refer to it as a line 4,000 miles in length. This is not quite correct. As a matter of fact the line is 3,900 miles long, 1,700 miles of which are deep waterways which act as a natural barrier to livestock, and several hundred miles of the remaining 2,200 are situated in mountainous country and are not accessible to domestic animals.

Inspectors of the Health of Animals Branch are permanently stationed at various points along the American boundary and cover all ports of entry eligible for the entry of live stock.

There is no record of an outbreak of Foot-and-Mouth disease within the boundaries of Canada. The last appearance of Foot-and-Mouth disease on Canadian shores occurred thirty-seven years ago. One was in a shipment of cattle arriving on May 4, 1884, at Point Levis Quarantine Station, Quebec, on the ss. *Mississippi*. Another consignment arrived on June 7, of the same year at the same station, on the ss. *Oxenholme*. These are the last records

of Foot-and-Mouth disease in Canada, and, strangely enough, both consignments came from Great Britain. The animals in the shipment above referred to were all dealt with at Point Levis Quarantine Station, and, as pointed out above, the disease did not get a footing in Canada.

Previous to 1892 serious outbreaks of contagious pleuro-pneumonia have occurred in the United States. Outbreaks of Foot-and-Mouth disease have also occurred in that country in 1870, 1884, 1902, 1908 and 1914, and not a single case of either disease has ever occurred in Canada as a result of these American outbreaks. This is a proof that Canada is quite capable of protecting her boundary against contagious diseases occurring in the United States. The possibility of contagious disease of animals reaching Great Britain from the United States through Canada is extremely remote. In the first place all animals are given a close inspection when crossing into Canada by qualified representatives of the Health of Animals Branch. Supposing that it was even possible to escape detection at the boundary line, the disease would then appear among Canadian herds and be properly dealt with by the Field Division of the Health of Animals Branch.

Then before the animals are placed on shipboard a last close examination is made, and in addition there is the length of time required from point of origin to destination, which would be sufficient under ordinary conditions to cover the period of incubation of nearly all the contagious diseases that we might fear, so that from a practical standpoint no alarm need be manifested in this regard.

I may say that the Health of Animals Branch, during recent years, has been very much improved, and is more efficient to-day than ever before. Some doubt seems to exist in the minds of some prominent men in Great Britain

that Canada is able to protect this boundary, but the fact that Canada has successfully protected it on so many occasions in the past, and is protecting it now, should satisfy everyone as to her ability to do so.

Rinderpest, or cattle plague, has never existed in Canada. Outbreaks of Anthrax are rare and only occur as limited outbreaks, and are promptly dealt with.

Cattle mange, which was found in a limited area in Alberta and Saskatchewan, has now been practically eliminated. There is no longer any blanket quarantined mange area in Canada. Only a few farms in one province are under quarantine for suspected mange.

In the event of stocker cattle being shipped to Great Britain, no shipments would be permitted from the farms under quarantine, in fact, heavy penalties are levied under the Contagious Diseases Act for the removal of animals from a quarantined area without a license. I am informed, however, that cattle mange is not considered of sufficient importance in Great Britain to be scheduled as a contagious disease.

Should the embargo on Canadian cattle be lifted, Canada is ready to adopt such measures as will ensure the permanent identifications of cattle imported to Canada from other countries and thus remove any possibility of foreign cattle finding their way to Great Britain as Canadian stores. This would be a simple matter to arrange. On account of the excellent health record of Canadian cattle it would not be difficult to formulate importation regulations in Great Britain on a freedom from disease basis that would ensure entry for Canadian stores without permitting cattle from other countries which do not possess so good a bill of health as Canada, from taking advantage of the lifting of the embargo.

While the measures adopted by Canada for the protection of her bound-

dary have proven adequate in the past, the Canadian Government is quite willing to discuss any further reasonable measures for its protection that may be suggested by the British Government, in the event of the embargo being lifted.

Canada frequently imports pedigreed cattle from Great Britain, where "Foot-and-Mouth" outbreaks are not infrequent, twenty-four outbreaks having occurred in Great Britain during the year 1920. These cattle are imported under certain regulations imposed by the Canadian Government, and these importations have been made without exposing Canadian cattle to infection. If it is possible for Canada to import these breeding cattle from Britain with safety it is difficult for Canadians to understand why it should be dangerous for store cattle to be imported into Great Britain from Canada, where Foot-and-Mouth disease has not existed for thirty-seven years, and then only in a quarantine station.

As a further guarantee of protecting Great Britain against disease, the Canadian Government is willing to have an export inspection made by capable officers of all store cattle shipped from her ports to Great Britain, and to forward with each shipment a certificate showing that inspection has been regularly made.

Canadian store cattle can be shipped to the United States, France, Belgium, Switzerland, and Germany, and the healthy condition of Canadian cattle is generally admitted in the countries to which shipments have been made and great surprise is expressed at the refusal of the Mother Country to grant a similar privilege.

It is particularly noted that, owing to the exceptionally and indeed historically healthy condition of our stock, Canadian cattle are admitted to France without slaughter, and it is quite apparent that France is quite satisfied with Canada's ability to protect her herds.

It should be observed that, since placing the embargo, over three million head of Canadian cattle have been slaughtered under inspection at British ports and no case of Pleuro-Pneumonia or Foot-and-Mouth disease has been discovered.

In addition, we wish to quote some of the pronouncements of the British Ministers of Agriculture and other officials.

Mr. Prothero, then President of the Board of Agriculture, speaking before the Imperial War Conference, April 26, 1917, said:—

“I also believe that at the present moment and for many years past, as far as I can make out, Canada has been free from the disease, and on these grounds, therefore, we should receive the present suggestion for the removal of the embargo very sympathetically. We do not believe that there is now, or has been for a good many years past, the slightest ground to exclude Canadian cattle on the score of disease.”

Confirming this view, the Board of Agriculture on Saturday, July 26, 1919, issued a statement, which was quoted in the *Times* issue of July 28, and in which the following paragraph appears:—

“It is admitted by the Board of Agriculture that the bar to the importation of Canadian stores can no longer be maintained on the score of health. For many years cattle born and bred in Canada have been exceptionally free from all forms of infectious disease—indeed there are probably no cattle in the world which can show so clean a bill of health. Even the possibility of the introduction of infection through cattle which somehow or other had crossed the long line frontier between Canada and the United

States could be dismissed, because suitable precautions could undoubtedly be taken to ensure that any imports allowed were cattle that have been born and bred in Canada, and were leaving it for the first time for direct shipment to a British port.”

On January 12, 1921, Lord Lee, Minister of Agriculture and Fisheries, in further support of this pronouncement, stated, according to the Ministry of Agriculture Bulletin, February, 1921, to the Joint Parliamentary Committee of the Co-operative Congress which waited on him, that the Ministry had publicly endorsed the clean bill of health to which Canadian cattle were entitled.

In consideration of this official view, which was first advanced by a responsible minister of the Crown in 1917, was publicly reaffirmed by the Ministry in 1919, and was again confirmed by the succeeding Minister in 1921, the Canadian Government is of the opinion that further argument is unnecessary and that it is justified in assuming that under the circumstances in which this opinion was given, it should meet every fear of the British people as to the risks involved.

It has been suggested that it would be impracticable to admit Canadian cattle and exclude those from other countries. Lord Lee apparently took this view in that, while admitting the health of Canadian cattle, he contended that Canada was not the only exporting country and that if legislation were proposed it would be impracticable to limit its operation to Canada alone. We are informed that in so far as home control is concerned the Irish Department of Agriculture is in practically the same position in Ireland in relation to the Mother Country as the Department of Agriculture in Canada and we feel that as Canadians we have, under the circumstances, the right to expect equal treatment.

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That there need be no obligations felt toward foreign countries in connection with the admission of Canadian stores was clearly set forth by Lord Onslow, President of the Board of Agriculture, in his reply to a delegation which waited on him on October 15, 1903. Lord Onslow said:

"But there is one point at any rate which I would like to clear out of the way. I think reference was made to it by more than one speaker, and that is that there might be some difficulty in connection with the treaties which this country is under obligation to with foreign countries. I say at once, without the slightest hesitation, that, so far as any commercial arrangements or arrangements in connection with the importation of cattle or the exclusion of disease is concerned, we will not consent to be in any way overruled or under any obligation to foreign countries. So far as our colonies are concerned, we intend to keep absolute freedom to do what we like within the British Empire."

The presentation of the Canadian case is designed to show that there is not now and indeed never has been ground for the exclusion of Canadian cattle because of disease prevailing in Canadian stock and that such exclusion originating in allegation of such disease and continued in the same form through all these twenty-nine years has cast an implication upon Canadian cattle which has seriously affected the Canadian cattle trade and has thus constituted a grave and wholly indefensible injustice to the Dominion. It has been designed in part to show as well that only on the ground of protection from disease and not of protection from competition has such implication been maintained. It is true

that of recent years, as shown above, there have been on the part of British authorities frank admissions that the implication could no longer be sustained on the basis of a charge of disease against Canadian stock but the very fact that the embargo so originated and notwithstanding the unceasing protests of the Canadian Government throughout these years is still maintained constitutes a continuance of implication and a continuance of injustice. If the British people desire to protect their cattle industry by giving economic advantages to the home production that is the business of the British people.

While we desire to urge, as will be set out further on, that owing to the long and heavy freights, particularly on cattle transportation, such protection may not be considered necessary, we most definitely and strongly affirm that such protection cannot be justly or defensibly reached by the means now employed.

The continuity of the supply of store cattle to Great Britain will be better ensured with two sections of the Empire furnishing these animals (Ireland and Canada) than if you simply depend on one section, and we think it is safe to assume that more satisfactory prices to the feeder will ensue.

It is now desired to present certain considerations which, admittedly, are of moment, rather from the standpoint of the interests of the United Kingdom, economically and otherwise, than from the single standpoint of Canadian interests, and in making these representations we wish it distinctly understood that they are presented with complete deference to the undoubted right of the British Government to measure their importance and alone to decide as to their value. Certain of them, however, affect the broad question of inter-Imperial trade in which all parts of the Empire have vital interest.

**The Argument that the Admission of
Canadian Stores will put British
Cow-keepers out of Business**

This argument, as advanced by various farming interests, is in line with the position so strongly taken by the breeders of pure-bred cattle, notably by Lord Crewe, Lord Bledisloe and others, to the effect that a consistent policy of isolation is necessary to protect the interests of the British live stock industry as that industry is of such vital importance to the country as a whole. This view is quite distinct from the decision reached by Lord Brule in 1919, when he gave it as his considered opinion that while admitting the health of Canadian cattle the situation in the country districts was at that time in such an unsettled condition that the removal of the restrictions would prejudice the efforts which were being made to restore confidence in the minds of the farmers and would definitely jeopardize the future of the industry. It is quite apart also from the question of disease which although undoubtedly relevant in the minds of many farmers and breeders, ought, as Canada contends, to be considered on its own merits and in relation to the admission by the Ministry of Agriculture that the exclusion of Canadian cattle cannot longer be continued on the grounds of disease. Normal trading conditions have now been practically restored and, as the effect of supply and demand is again operative, consideration of the objection of farmers and breeders on the score of protection to their business is definitely identified with the fiscal policy of the country.

Naturally, this is a question in regard to which Canada must defer to whatever view may be taken by the British Government, except perhaps with respect to whatever arguments may properly be advanced in the interests of the Empire in any joint discussion of Imperial policy. It is very significant, however, that in the early years of this contro-

versy a particularly definite pronouncement as to the attitude of the Board of Agriculture toward a policy of protection was made by the Right Honourable the Earl of Carrington, President of the Board, to a deputation which waited on him on January 5, 1906. In his reply, after referring to a suggestion that the policy of the British Government had been dictated by the demand that British cattle breeders should be protected against cheap outside competition, Earl Carrington said:

"The subject, in my opinion, does not turn on that point at all. All that is absolutely beside the question. I cannot admit that that could possibly be allowed to be a reason for keeping Canadian or other stores out of the kingdom. I do not admit—I cannot admit, as Minister of Agriculture—that these restrictions are imposed to keep up the prices of store cattle in this country. If I thought so for a moment I would go to the Cabinet and do my best to have it done away with at once. . . . I do not admit that argument and I only take my stand on the risk, and the risk only, of the importation of possibly diseased cattle to the danger of the flocks and herds in the United Kingdom."

In the light of this pronouncement and in consideration of British trading policy generally, Canada has assumed that the British Government does not propose to place itself in the position of justifying the exclusion of Canadian cattle on the grounds of agrarian protection and that therefore the Dominion may very properly ask for consideration of the whole question from the standpoint of the economic advantages which it is firmly believed would accrue alike to the farming interests of both Canada and Great Britain, as well as to the great consuming population of the Mother Country.

Economic Advantages to the Mother Country

(a) *Canadian Output would be Increased.* The removal of the embargo would ensure, as would no other steps that could possibly be taken, a steadily increasing and readily available supply of beef from the Dominion nearest her own shores. The importance of this to the United Kingdom the British Government must itself determine. It will be recognized, however, that production is based on confidence in the market, and to obtain maximum production in Canada no other measure will prove of equal or more permanent effect.

(b) *Home Supply would be Augmented.* It will greatly augment the supply of home-killed meat. Great Britain is steadily falling behind in the proportion of beef killed within the country as compared with the tonnage of the product imported. The exact history of the trade is indicated by the following statistics which show the percentage of fresh killed beef, including foreign live stock, in relation to the total supply available for consumption:

1904	1908	1913	1918	1920
80%	76%	63%	67.5%	61.52%

That the percentage for 1918 was as high as it is, is due rather to the forced reduction of imported supplies than to any increase in the home-killed product, which, to be exact, was then actually less than in any year since the commencement of the dead meat business. On the other hand, the percentage in 1920 accurately represents the decreasing ability of Great Britain to supply her own needs and her growing dependence upon foreign sources of supply. This is natural, not only in view of the expanding population of the British Isles, but as well, because of the fact that dairy cattle must be maintained in larger and larger numbers to meet the steadily increasing requirements of milk. Dairy herds may be looked upon as a profitable and practicable source of

supply for veal but can never be regarded as offering any satisfactory provision toward meeting the need for feeding cattle. It has been the experience of all thickly populated and intensively cultivated countries that it is more profitable to produce milk than to rear store stock; hence it will be found that Great Britain must depend more and more largely upon cheaper outside sources of supply for her store cattle if she would follow the agricultural practice which will net the greatest returns to her farmers.

In this same connection an analysis of the export movement of fat and store cattle from Ireland to Great Britain is of interest:—

	Fat	Store
	Cattle	Cattle
Average for 10 years		
1878-87.. . . .	264,190	353,350
1888-97.. . . .	272,725	369,249
1898-07.. . . .	263,755	468,197
1908-17.. . . .	339,627	405,260
Average for 5 years		
18.. . . .	405,023	371,647
Exported in 1918.. . .	375,705	289,709
Calendar year 1919..	531,842	194,781
Nine months ended		
Sept. 30, 1920.. . .	326,108	272,917

The regular increase in the exportations of fat cattle as compared with the corresponding decrease in recent years of the supplies of store cattle is clearly suggestive of Ireland's present agricultural policy. Of this matter Lord Ernle, Ex-President of the Board of Agriculture and Fisheries, has the following to say:—

“Ireland is advancing most rapidly in its agricultural development. If we get cattle from Ireland they will increasingly come over here in the form of finished, fully-fed cattle. Therefore, the supply of Irish store cattle is likely to diminish.”

That there is growing concern, particularly amongst feeders in certain areas, as regards the supply of young, vigorous, thrifty store stock is so well known as to require no comment. It is not for Canada to argue as to British agricul-

tural policy, but it may not be improper to say that with the increased cultivation of arable land and where market conditions, as in the United Kingdom, justify highly intensive management, experience has shown the practical advantage and profit in specializing in the finishing business rather than in continuing, to the usual extent, the breeding and rearing of store cattle. The United States, Canada, Ireland, and Great Britain herself have clearly demonstrated the truth of this deduction.

Recognizing the existing shortage of store cattle, Britain can, of course, continue her policy of exclusion and set herself to the task of producing larger numbers of stores upon her own farms. To do so, however, is clearly to diminish her capacity to finish a corresponding number of market cattle, and does not appear to be in accordance with the commercial cattle experience of the Corn Belt of America, or other great feeding areas of the world. On high-priced, intensively tilled land the turnover in the rearing of store cattle is too slow to be remunerative. The open spaces of Canada can land stores on the highly cultivated farms of Britain at less cost than these can produce them, both as regards maximum output in actual tonnage of beef and in profit to the individual farmer, and it is submitted that Britain will find it to her distinct advantage to co-operate with Canada in this matter rather than to attempt to depend wholly upon her own resources.

The problem of securing a sufficient number of stores from Ireland is now further complicated by the continued appearance of foot-and-mouth disease in that country and by the necessity of the Ministry of Agriculture declaring an embargo against the importation of Irish stores.

The suspension of supplies from Ireland was at once productive of an increase in the price of home-killed meat in England, the rise within a week being as much as 1-1/2d. per pound. The cri-

tical situation which has arisen well illustrates Britain's dependence upon Ireland and at the same time distinctly confirms the claim, made by all advocates of the removal of the restrictions, that the importation of Canadian feeding cattle would at once regulate, if not appreciably lower the price of home killed meat to the British consumer.

On the other hand, British breeders or those engaged in the rearing of stores have little ground to fear Canadian competition, provided of course they do not insist upon an absolutely protected market but are willing to meet in reasonable degree the effect of supply and demand on the basis of the general movement of the world's meat business. Inasmuch as Great Britain can supply only about 60 per cent of her own requirements and in view of the fact that home-killed beef always commands a steady premium over the frozen and chilled product, British feeders will always be catering to an active market. The gravest competition which British feeders are called upon to face is undoubtedly that resulting from the huge imports of foreign beef, and British live stock interests would appear to be strengthening their own position rather than otherwise by taking whatever steps are possible to secure a larger control of their home business as a defence against the dominating position held to-day by those in control of the world's dead meat trade.

(c) *Supplementary Industries would be Affected Beneficially.* The removal of the embargo with the consequent importation of Canadian cattle will provide more work for British labour, will increase the domestic supply of leather, and will make it possible for the poorer classes to obtain at low prices much larger quantities of fresh offal, hearts, livers, heads, etc., than has been available since the discontinuation of the stocker cattle trade. These clearly are supplementary considerations, but they are of no mean importance in view, particularly, of the shortage of leather, of

the high cost and poor quality of frozen offal, and of the important advantage of extending every possible channel for the employment of labour, both by developing supplementary industries and by increasing supplies of raw materials. Unquestionably the profits from the trade in offal, fertilizer, and allied products, together with the control they exercise over the hide and leather business, constitute most important factors in the power of the United States meat dealers.

(d) *Trade in Pure-bred Stock would be Increased.* From the standpoint of British breeders of live stock perhaps the most important consideration is the fact that the removal of the embargo will unquestionably promote the importation by Canada of pure-bred live stock from the United Kingdom. On the other hand, the continuance of the embargo will decrease it. An extensive trade in stores will undoubtedly result in an increasing return trade in pure-bred bulls, of which Canada is all too short. The opening of the British market to Canadian cattle would give such a decided stimulus to the Canadian cattle industry as to set on foot a general movement to secure an improvement in the quality of the cattle stock of the country. Under such circumstances heavy annual purchases would continue to be made in Great Britain. Conversely, should the embargo be continued, Canada must endeavour by all means in her power to secure a permanent, unrestricted outlet for her surplus to the United States markets. Already this trade has resulted in the sale by American breeders to Western Canada of many high-priced cattle and other live stock. The future value of such a trade is already recognized in the United States, and it is clear that this business would prove of considerable significance in any trade negotiations which may be undertaken. It would be unfortunate from many points of view should Canada be forced into a commercial ar-

range ment which would prove of disadvantage to the Mother Country.

Trade in Sheep.—Similar arguments apply as regards the exportation of live sheep. It is not anticipated that were the embargo removed this trade would reach large dimensions. Canada has, all told, about 3,000,000 sheep, and, is not reckoned as an important sheep raising country. On the other hand, to ensure any progress whatever it is essential that a permanent export outlet be found to absorb the annual surplus. Canadians are not heavy consumers of mutton, consequently a surplus of lambs, particularly during the fall months, is regularly met with. The United States has usually absorbed this, but again owing to the unstable trade relations between the two countries, this outlet may at any time be closed to the Dominion. Should this occur, the Canadian sheep industry, lacking an alternative outlet, would dwindle to insignificant proportions. To safeguard this situation Canada is seeking a permanent market elsewhere. The fact that the surplus during the fall months, as in the case of cattle, is largely of unfinished stock emphasizes the need that this outlet be for live sheep. If such a market can be secured it will steady market prices during the heavy fall runs and will do more to inspire confidence amongst producers thus stimulating production than would any other measure that could be adopted. It is known that English and Scotch feeders would welcome the opportunity of again being enabled to handle Canadian store sheep.

Economic Advantages to Canada

(a) *Export Outlet Necessary.*—Canada has annually a large surplus of heavy partially finished cattle which is not readily absorbed by the domestic trade and for which she must secure export outlet. In 1914 she exported to the United States 206,446 head of cattle; in 1915, 183,672 head; in 1916, 227,202 head; in 1917, 164,169 head; in 1918,

189,229; in 1919, 532,309 head; in 1920, 311,070 head. This heavy exportation was carried on despite urgent and partially successful measures undertaken by the Federal Department to promote and extend the return of store cattle to farmers for finishing purposes.

As the United States market is uncertain and, in view of the tariff measures which have now become law in the United States, a permanent export outlet to take care of this surplus is essential. Otherwise the raising of cattle will diminish and the whole cattle industry suffer. Given such an outlet, however, the finishing of cattle within the country to the extent to which conditions will permit will steadily increase as the Dominion develops.

The reason for this will be better understood when it is explained that, owing to climatic conditions, to the shortage of labour, and to the sparsely settled and partially developed condition of the country, Canada can produce and rear a much larger number of store cattle than she can feed and finish. The more effective the effort to extend cattle production the more, meanwhile, will this condition be emphasized. This fact was clearly demonstrated by the experience of the war. Canada, therefore,

must seek a practicable outlet for her store cattle, either in the United States, Great Britain or elsewhere or the confidence of her farmers in the industry cannot be maintained.

(b) *An Alternative Market.*—Canada is earnestly seeking an alternative market to better secure the independence of her producers. In this regard the interests of the Dominion and of the Mother Country are identical. The more fresh beef which can be produced within the United Kingdom the less will British trade be under the domination of the foreign meat interests. As we shall show later, the importation of Canadian stores, if systematically carried on, will considerably and economically augment the supply of home-killed beef. To this extent, then, will the independence of both countries be strengthened.

(c) *Movement Commercially Practicable.*—The margin upon which Canadian producers would have to rely in selling stores to Britain is indicated by the fact that both stores and fat cattle in the United Kingdom are worth practically half as much again as they are in Canada. The following table showing the average wholesale prices per pound makes clear the difference in value between home-killed and imported meat:—

	Home-grown	New Zealand	Australia	South American Chilled	South American Frozen
1914.	7½d.	4½d.	4½d.	4½d.	4½d.
1915.	9½d.	6½d.	6½d.	6½d.	6d.
1920.	16d.	10d.	8½d.	10½d.	10½d.

A comparison of Canadian with British markets and a careful analysis of the history of the trade determine two facts (1) the margin between prices paid in the two countries is such, freight differential considered, as to make possible commercial movement from Canada to Britain; (2) live cattle values, as compared with dead meat prices, indicate the advantage to Canada of securing the outlet which will enable her cattle to qualify for the high-class trade in fresh-killed meat.

If this outlet is unavailable, and should the present market be closed to Canada, she would be forced to face competition with the Argentine for the whole of her product, on the basis of the lower chilled and frozen beef values. Again, as she always has a surplus of young and unfinished cattle for which no export outlet offered, she would be obliged to face serious gluts on the market at certain seasons of the year. Under these circumstances confidence amongst the farmers would be difficult

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to maintain and the future of the beef cattle industry would be in a much less desirable position, and the different interests in the United States would benefit inasmuch as they would be able to purchase this meat at a cheap price when the run was on and ship it to Great Britain as frozen meat and at a substantial profit.

In view of the facts noted above, British interests will perhaps be better able to understand the practical reason why Canadians are endeavouring to secure admission for their store cattle in preference to the market which now exists for cattle landed for immediate slaughter. Canada at present has no well-recognized feeding grounds commensurate with her productive power and comparable to the Corn Belt of the United States or to the rich pastures of Scotland and England. The best commercial cattle that she can produce need from two to four months further intensive feeding under British conditions to give them the finish and flesh which will enable them to favourably compare with prime Scotch and English bullocks.

(d) *Possible Supplies from Canada.*
—British interests may properly ask for

a definite statement as to the supply of store cattle which may be expected from Canada annually in the event of the import restrictions being removed. The cattle population of the Dominion is in the neighbourhood of 10,000,000 head distributed by provinces as follows:—

Cattle Population—By Provinces

	1920
British Columbia.. . . .	154,972
Alberta.. . . .	1,355,941
Saskatchewan.. . . .	1,324,062
Manitoba.. . . .	757,974
Ontario.. . . .	2,881,827
Quebec.. . . .	2,132,212
New Brunswick.. . . .	332,988
Nova Scotia.. . . .	398,461
Prince Edward Island.. . . .	139,143
Canada.. . . .	9,477,580

A few store cattle may be drawn from all the provinces but the main source of supply is to be found in Western Ontario and in the three Prairie Provinces, particularly in the pasture areas of Southern Alberta and Southwestern Saskatchewan. A detailed statement of Canada's exports of live cattle and beef since 1890, with the view of accurately indicating the stability and extent of this trade, is given below:—

TOTAL EXPORT OF BEEF FROM CANADA TO THE UNDERMENTIONED COUNTRIES 1910-1920.

Year	United Kingdom Lbs.	United States Lbs.	Other Countries Lbs.	Total Lbs.*	Total Value \$
1910.. . . .	824,140	48,503	441,754	1,318,397	109,993
1911.. . . .	482,371	1,957	490,083	974,411	91,844
1912.. . . .	274,419	5,711	668,641	948,711	86,596
1913.. . . .	782,920	19,474	768,585	1,570,979	135,111
1914.. . . .	190,787	12,772,291	654,629	13,617,707	1,127,911
1915.. . . .	1,330,482	17,697,917	642,302	19,670,701	1,988,489
1916.. . . .	12,912,771	9,456,290	*25,534,504	48,903,565	5,994,833
1917.. . . .	15,179,195	10,039,593	*20,327,388	45,546,176	5,750,435
1918.. . . .	32,768,400	12,672,602	*41,124,102	86,565,104	13,016,378
1919.. . . .	91,644,900	32,965,700	*1,192,300	125,802,700	26,594,814
1920.. . . .	28,730,500	34,418,000	*40,751,000	103,899,500	19,637,656

* 1916, France, 14,000,000 lbs.
* 1918, France, 40,000,000 lbs.
* 1920, France, not specified.

* 1917, France, 18,500,000 lbs.
* 1919, France, not specified.

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EXPORTS OF LIVE CATTLE FROM CANADA TO THE UNDERMENTIONED COUNTRIES FROM 1890 TO 1920 INCLUSIVE (FISCAL YEARS)

Year	Great Britain No.	United States No.	Other Countries No.	Totals No.	Total Value \$
1890..	66,965	7,840	6,649	81,454	6,949,417
1891..	107,689	2,763	7,309	117,761	8,772,499
1892..	101,426	551	5,202	107,179	7,748,949
1893..	99,904	402	6,918	107,224	7,745,083
1894..	80,531	256	5,270	86,057	6,499,597
1895..	85,863	882	7,057	93,802	7,120,823
1896..	97,042	1,646	5,763	104,451	7,082,542
1897..	120,063	35,993	5,308	161,369	7,159,388
1898..	122,106	87,905	2,999	213,010	8,723,292
1899..	115,476	92,834	3,537	211,847	8,522,835
1900..	115,056	86,989	3,479	205,524	9,080,776
1901..	119,050	46,244	3,985	169,780	9,064,562
1902..	148,927	31,703	3,803	184,473	10,663,819
1903..	161,170	10,432	5,178	176,780	11,342,632
1904..	148,301	3,517	5,599	157,417	10,424,671
1905..	159,078	3,696	4,328	167,102	11,360,969
1906..	163,994	4,726	7,310	176,030	11,656,829
1907..	149,340	8,184	4,617	162,141	10,932,539
1908..	124,015	23,612	3,366	150,993	9,301,184
1909..	143,661	16,130	3,154	162,945	10,771,366
1910..	140,424	12,210	4,752	157,386	10,792,156
1911..	113,795	7,576	3,552	124,923	8,537,473
1912..	47,868	9,867	3,842	61,517	4,098,179
1913..	12,069	28,268	3,959	44,296	2,237,135
1914..	9,788	206,446	3,615	219,849	7,906,794
1915.. . . . .	.....	183,672	2,252	185,924	9,267,534
1916..	1,752	227,202	12,581	241,535	12,625,760
1917.. . . . .	.....	164,169	1,967	166,136	7,883,842
1918.. . . . .	.....	189,229	2,130	191,359	14,136,944
1920..	479	500,216	*14,830	515,525	46,064,631
1919.. . . . .	.....	308,562	2,934	311,496	30,069,490
Calendar year 1920.. . . . .	.....	.....	.....	240,660	22,684,831

* 1916, France, 10,600.

*1920, France, not specified.

Canada can export under normal conditions, from 200,000 to 500,000 head of cattle per annum. The latter figure represents the maximum that could be forwarded overseas and would probably be reached only under particularly favourable conditions. With the United States market, however, closed against the Dominion, a range of from 200,000 to 400,000 can reasonably be depended upon, and as a cattle producer Canada is still in her infancy.

Conclusion

By way of conclusion, Canada fully appreciates that the British Government must take every necessary precaution to maintain confidence and safeguard the stability of the agricultural interests of Great Britain. The strategic importance of this policy is

well understood. Further, it is realized that at the root of all the opposition that exists to the removal of the restrictions lies a fear that whether from the risk of disease or the result of competition, the future of the live stock industry will be endangered. The question of disease has already been dealt with. As regards competition which would result in the demoralization of the market, British feeders or breeders should realize that such an eventuality would be as much a catastrophe to Canadian interests as to their own. The development or continuance of an import live cattle trade is absolutely dependent upon firm, steady prices and in this regard the interests of the Canadian and British producer are identical. On the other hand the breeders of store stock in the British Isles are always protected by the heavy transportation

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cost in connection with the shipment of Canadian live cattle. This cost in the case of the forwarding of a steer from Calgary to Liverpool amounts at present to the equivalent of an import tax of 2½d. per pound. It is submitted that a trade which is naturally protected against outside competition by the equivalent of an import duty from 30 to 35 per cent of the value of the produce ought to be in a fair way to realize a reasonable profit on its investment. If Canadian producers can face such a handicap and still make a profit, it would seem that British consumers may have a definite interest in the situation looking to the regulation by outside competition of the cost of home killed beef. Canada cannot afford to produce or forward cattle unless assured of a reasonable profit over and above transportation cost, and any decline in British prices will be more quickly and effectively felt in the

Dominion than in the Mother Country. Under present conditions, however, Canada would find a definite advantage in shipping to the British market, and it is evident, therefore, that it is in the interests of the British consumer that she should do so. On the other hand British breeders possess a geographical protection which ensures them continuously such a workable margin of advantage as, under present conditions in relation to world movement of food products, should provide every reasonable confidence in the future of the industry.

The foregoing constitutes the case of Canada as from the beginning advanced and urged with greater insistence from year to year. We now wish to draw emphatic attention to the fact that the conclusiveness of this case has already been considered by the British authorities and a definite assurance given that the embargo would be removed.

PART I

Dominion Department of Agriculture

INSPECTION OF FRUIT FOR EXPORT AND INTER-PROVINCIAL TRADE

BY C. W. BAXTER, FRUIT COMMISSIONER

TWENTY-FIVE years ago Canada was in danger of losing her export apple trade owing to the high percentage of consignments received on the British markets showing large quantities of over-faced and improperly packed and graded fruit. It was felt that the unsatisfactory conditions governing the industry were due largely to the absence of any regulations governing the packing, grading and marking, thus making it impossible to place any reliance upon the grade marks appearing upon the barrels. While the lack of standardization was felt in all markets, the export and inter-provincial trade was particularly affected, a reliable system of grading being more important in the case of long distance than local shipments, where difference of opinion between shipper and consignee can be more easily adjusted.

As the returns to exporters were reflecting the lack of confidence felt by buyers in the United Kingdom, and as it was realized by those interested in the welfare of the industry that the trade could not be saved from retrogression without standardization, the more progressive growers and shippers requested legislation providing for compulsory grading and marking, and in 1901 the Fruit Marks Act was passed. The object of the Act was to raise the standard of the commercial pack of fruit in Canada, the improvement of the export trade being particularly in

the minds of those framing its provisions.

The administration of the Act was placed with the Department of Agriculture, and a staff of eight inspectors was charged with its enforcement. During the first few years of the operation of the Act, the inspection was confined almost entirely to the ports of export, and almost immediately a marked improvement in the grading and packing of the apples offered for export was noticeable. Even as early as the second season the satisfactory results of its enforcement were being commented upon in the United Kingdom, one large fruit broker writing under date January 10, 1903: "In reference to the packing of apples in barrels, there can be no doubt that the passing of the Fruit Marks Act (1901) has had a most beneficial effect in improving the grading and marking of fruit." References were also made to the Act in the British press, an article in the *Glasgow Herald* of December 29, 1902, reading in part: "Recent legislation in Canada has done much to remove complaints as to the marking of packages and of the quality of the fruit."

As the advantages of the inspection service became apparent, growers, shippers and dealers urged upon the Department the necessity for an extension of the work to include the principal distributing and consuming points in Canada and also to cover many other kinds

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of fruit grown commercially in this country. Amendments have been made to the Act from time to time, prescribing grade marks, defining grades, standardizing packages, etc.

From 1901 to 1912 the work of inspection was confined practically to the docks at Montreal, St. John and Halifax, and to the large consuming centres such as Toronto, Winnipeg, Regina, Calgary, and Vancouver. The manner of inspection was to open and examine a number of packages from each lot, and if the fruit was not packed in accord-

run the risk of prosecution as the chances of detection were fairly remote, particularly in the case of export fruit, it being possible to inspect only a small percentage of the apples for export, owing to the speed with which these are loaded from the cars into the steamer's hold—the inspection being made on the dock as the loading was in process.

In 1913, therefore, some additional inspectors were appointed, and the work extended in certain sections to the shipping centres in the producing districts. The result of this change soon showed



Dominion Government Inspectors examining apples for export at docks in Montreal.

ance with the Act, a report was made to that effect and the packer prosecuted if, after thorough investigation, the facts warranted such action. While this method, which was the only practical one with the few inspectors on the staff, undoubtedly had a deterrent effect on packers and shippers who were anxious to avoid prosecution, it did not prevent the improperly packed and marked fruit reaching the market. Also in the case of the less reputable packers and shippers, there was a tendency to

a material improvement, and by 1914 this system of "inspection at point of shipment" had been adopted in all commercial fruit growing districts, and has been continued to date, so that this season practically the whole staff of over sixty inspectors are working among the growers and packers, not only inspecting the fruit after it has been packed, but giving instructions in the orchards and packing houses in the proper methods of picking, grading, packing and shipping fruit. Instead of waiting

to detect false packing or grading after it has been done, the inspectors to-day are spending their time and energy in preventing the evil, thereby protecting the grower from commercial and financial loss in marketing his fruit and, in addition, protecting the consumer, and establishing greater confidence in the trade. This is particularly valuable in the case of export and interprovincial shipments, as the inspectors endeavour to give special attention to all requests for the inspection of long distance shipments.

As the packing season is short, it is impossible for the inspectors to visit every orchard, and consequently a great many lots are inspected at the shipping station. If fruit is found not up to grade, the inspector at once communicates with the packer and requests him to examine the shipment, giving him a practical demonstration in grading; the packer, if circumstances warrant it, is then given an opportunity to reduce the grade before his fruit is shipped. If the grade is not lowered in accordance with the quality by the packer, the inspector may mark the words "Below Grade" on the package, or he may efface the false mark and place the proper grade mark thereon.

Of special value in the case of inter-provincial shipments, particularly to the prairie markets, is an arrangement made the past few years by which officers of the Branch are authorized to give any shipper desiring it, a copy of the report referring to his fruit, which is often attached to the bill of lading by request of the consignee. Such a report does not vouch for the contents of the car, but for those packages only which have been actually inspected and marked with the inspector's stamp, but dealers have demonstrated their willingness to purchase cars on the strength of these reports.

Since 1918 the inspectors at such points as Vancouver, Winnipeg, Toronto, and Montreal have also been authorized

to inspect rejected cars, and give a report to the consignee or consignor as to the condition. In the past serious loss and waste of fruit and vegetables have been incurred through consignees refusing to accept cars, necessitating the re-consignment and possibly a second rejection or a forced acceptance at a greatly reduced price. The principal reason for undertaking the inspection of such cars was to facilitate prompt delivery, thus avoiding unnecessary waste of food. This service has also assisted materially in ensuring prompt settlement of disputes between shippers and consignees, and has proved particularly valuable in inter-provincial trade where, the disputing parties being a great distance apart, one or the other was very often at a disadvantage. The report of an impartial inspector has frequently been the means of effecting a prompt settlement.

Closely connected with the inspection of fruit for the inter-provincial and export trade, is the work done by the Transportation Division of the Fruit Branch. Experienced traffic men are stationed at several points in order to advise shippers as to the proper routing for long distance shipments; complaints of improper loading or handling of fruit in transit are investigated; methods of distribution are carefully studied with a view to recommending improvements. Improved methods of car loading are demonstrated, and assistance given in the work of experimental shipments and the testing of different types of cars. Work of this nature in connection with refrigerator car shipments from British Columbia to points in the prairie markets and East, were carried on during the season of 1920, with the co-operation of the Dairy and Cold Storage Branch. Fruit inspectors assisted in equipping the cars and accompanied them to their destination. Experimental work of a similar character is being carried on by the Fruit Branch this season (1921) from Ontario points.

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While in the early fruit inspection days apples were the principal fruit dealt with, during the past few years all kinds of fruits grown commercially in Canada, and also some vegetables, have been inspected and, as noted above, special attention is given to long distance shipments. In British Columbia a large increase was made in the staff of temporary inspectors early in June to look

after strawberry shipments, as the berry industry on Vancouver Island and the lower mainland has developed rapidly during the past two or three years. As the result of the special service rendered by Dominion Fruit inspectors at the shipping points, carload shipments to the Prairie Provinces have been an unqualified success.

THE DOMINION EDUCATIONAL BUTTER SCORING CONTEST, 1921

THIS is the third year of the contest. In 1919 and 1920 four creameries from each province contributed a 14-pound sample each month from May to October inclusive. This year only one creamery from each province sends a sample every month for the same period, but a different creamery must compete each month. In this way, six creameries from each province will participate in the 1921 contest. The contest was half over when the July samples were scored on August 2. The quality of the butter for the first half is finer than previous years.

The highest score of any sample since the competition commenced in 1919 was given the 1921 July sample from the Edmonton, Alta., City Dairy, which scored 43 for flavour and a total of 98 points. The highest scoring sample in June was from Central Creameries, Calgary, Alta., with a score of 42.5 and 97.5. The highest scoring sample in May was from Shoal Lake Creamery, Shoal Lake, Man., with a score of 42.5 and 97.

The average of the scores of the May, June and July samples from each province is as follows:—

Province	Average Score for Flavour	Average Total Score
Manitoba.	42.3	96.7
Alberta.	41.8	96.7
Quebec.	41.1	96.0
Nova Scotia.	40.3	94.5
Saskatchewan.	40.3	94.3
British Columbia.	39.8	94.2
Ontario.	39.5	93.7
New Brunswick.	*40.0	93.6
Prince Edward Island.	*40.0	93.3
*Average score for May and June samples only.		

The defects in the 25 samples received were as follows: Flavour, not quite fine 1, not clean 7. Texture, weak 4, open 1, greasy 8, brittle 4. Incorporation of moisture, free moisture 6. Colour, slightly uneven 10. Salting, too heavy 3. Packing, poorly finished 7. Average per cent salt added at churning, 2.37 pounds. Average per cent salt in the butter, 1.45. Average per cent moisture in the butter, 14.05. Three samples gave a light reaction with the Storch test.

According to the scores, samples which were considered too heavily salted, contain 2 per cent or over by the salt test, and samples which were considered almost too mild in salt, although not scored down, usually tested less than 1 per cent. It would, therefore, appear

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that from 1 to 1½ per cent salt in the butter is about right for the export trade.

It is gratifying to again note the uniform type of butter made in the different creameries. The texture, incorporation of moisture and salting so far this season is, in the opinion of the judges, more uniform than in the previous contests. There is still quite a wide differ-

ence in the colour of the different samples varying from almost white to a deep June shade. The defects in colour so far this season are very slight which shows good workmanship on the part of the buttermakers.

It will be difficult to beat the Edmonton sample, but there are still 27 creameries to hear from before the contest is finished.

RECORD OF PERFORMANCE FOR POULTRY

THE third series of the Dominion Egg Laying Contests is announced to begin on November 1, and continue for the full period of 52 weeks. In addition to the Canadian contest, which will be conducted at the Central Experimental Farm, Ottawa, provincial contests will be carried on simultaneously. The location of these contests is the same as last year, namely, at the Experimental Farms and Stations at the following points: Charlottetown, P.E.I., Nappan, N.S., Fredericton, N.B., Cap Rouge, Que., Ottawa, Ont., Brandon, Man., Indian Head, Sask., Lethbridge, Alta., and Agassiz, B.C.

The Canadian contest is open to all, while provincial competitions are open only to entries from within the province in which the contest is held. The rules and regulations for Dominion contest are the same as last year with the exception of one or two minor alterations. The contests are intended to

qualify birds for certificates in the Record of Performance, which is provided in two classes.

(1) All birds in the contests, not otherwise disqualified, whose eggs average 24 ounces to the dozen, and which in 52 consecutive weeks lay 150 eggs, will receive certificates of Record Performance AA.

(2) Certificates of Advanced Record of Performance AA will be provided for those that lay 225 eggs and fulfil the other requirements.

During the test the birds are under complete control of the officers of the Department of Agriculture at the respective stations.

Further details of rules and regulations may be obtained from the Director of the Experimental Farms System, Ottawa, and from Superintendents of experimental farms and stations where the contests are carried on.

RECENT AMENDMENTS TO THE REGULATIONS UNDER THE DESTRUCTIVE INSECT AND PEST ACT

BY L. S. MCLAINE, CHIEF, DIVISION OF FOREIGN PESTS SUPPRESSION

IN order to meet with new conditions which have arisen in connection with the outbreak of the European Corn Borer in the United States, it was necessary to rescind the Order in Council passed on May 24, 1920, and substitute the following which was passed on May 21, 1921:—

Section 7.—The importation of the following into Canada is prohibited:—

- (h) Corn and broom corn (including all parts of the stalk) cut flowers or entire plants of chrysanthemum, aster, cosmos, zinnia, hollyhock, and cut flowers or entire plants of gladiolus and dahlia except the bulbs thereof without stems, and oat and rye straw as such or when used for packing, throughout the entire year, also celery, green beans in the pod, beets with tops, spinach and rhubarb, from June first to December thirty-first, from the following counties in four of the United States of America:

Massachusetts.—Barnstable, Bristol, Essex, Middlesex, Norfolk, Plymouth and Suffolk counties;

New Hampshire. — Rockingham county;

New York (Central).—Albany, Fulton, Montgomery, Rensselaer, Saratoga, Schenectady and Schoharie counties;

New York (Western).—Cattaraugus, Chautaugua, Erie and Niagara counties;

Pennsylvania.—Erie county;

unless the same are accompanied by a certificate of inspection issued by the United States Department of Agriculture which states that the shipment is free from infestation by the European

Corn Borer. This prohibition does not apply to the articles enumerated when they shall have been manufactured or processed in such a manner as to eliminate risk of carriage of the European corn borer, nor to cleaned shelled corn nor to cleaned seed of broom corn."

It was also found necessary to change the domestic quarantine governing the movement of corn in the districts infested by the European Corn Borer in southern Ontario. Consequently the Ministerial Order known as Quarantine No. 2 (Domestic) was rescinded and the following Order-in-Council passed on May 18, 1921, was substituted therefor:—

Order in Council Quarantining Certain Areas on Account of the European Corn-Borer and Restricting the Movement of Corn and Corn Products in Said Areas.

Notice of Quarantine No. 2 (Domestic).

Effective on and after the 18th day of May, 1921. Supersedes Ministerial Order passed on November 29, 1920.

The fact has been determined by the Minister of Agriculture and notice is hereby given that an injurious insect, the European Corn Borer (*Pyrausta nubilalis* Hubner, new and not heretofore widely prevalent or distributed within and throughout the Dominion of Canada, exists in the province of Ontario, and that there is danger of this insect being spread into other districts by reason of the movement of corn plants or portions of plants infested with the pest.

Therefore the areas comprised in the following townships are hereby quarantined:—

Wainfleet, Humberstone and Bertie, in the county of Welland; Moulton and

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Sherbrooke, in the county of Haldimand; Dereham, Norwich north, Norwich south, Oxford west, Oxford north, and Nissouri east in the county of Oxford; that part of the township of Middleton north of the Grand Trunk railroad in the county of Norfolk; Bayham, Malahide, Yarmouth, Dorchester south, Southwold, Dunwick and Aldborough, in the county of Elgin; Dorchester north, Westminster, Deleware, Caradoc, Nissouri west, London, Bidulph, Loba, Adelaide, Metcalfe, Ekfrid and Mosa in the county of Middlesex; Zone, Orford, Howard and Harwich in the county of Kent; Usbourne and that part of the village of Exeter east of the Grand Trunk railroad, in the township of Stephen in the county of Huron.

All the aforementioned areas being in the province of Ontario, and by this Notice of Quarantine No. 2 (Domestic), do prohibit the removal of corn fodder or corn stalks, including broom corn, whether used for packing or other purposes, green sweet corn, roasting ears, corn on the cob or corn cobs, from the said quarantined areas to points outside those areas.

This quarantine shall not apply under the following conditions:—

- I. To the articles enumerated when they shall have been manufactured or processed in such a manner as to eliminate risk of carriage of the European Corn Borer.
- II. To cleaned shelled corn and cleaned seed of broom corn.
- III. To shipments of the articles enumerated transported through the quarantined areas on a through bill of lading.
- IV. To shipments of the articles enumerated for experimental or scientific purposes by the Dominion Department of Agriculture or the Ontario Department of Agriculture.

V. To shipments of dried seed corn on the cob for exhibition purposes and consigned to the secretary of a winter fair or exhibition duly recognized by the Dominion Department of Agriculture or the Ontario Department of Agriculture. Such shipments shall be inspected at point of destination by an inspector duly appointed under the Destructive Insect and Pest Act.

Any person who contravenes this quarantine will be prosecuted as provided for in the Destructive Insect and Pest Act.

This order shall take effect forthwith and be in force until further notice.

Quarantine Passed by the United States Department of Agriculture Prohibiting the Importation of certain Plant Products from the Province of Ontario.

On July 21, 1921, the Federal, Horticultural Board of the United States Department of Agriculture revised their Quarantine No. 41 (Foreign). By this revision an embargo was placed against the province of Ontario on account of the European Corn Borer.

The following plant products are prohibited entry into the United States from the province of Ontario unless the same are accompanied by a certificate of inspection stating that the shipment is free from infestation by the European Corn Borer:—

“Celery, green beans in the pod, beets with tops, spinach, rhubarb, oat or rye straw as such or when used as packing, cut flowers or entire plants of chrysanthemums, aster, cosmos, zinnia, hollyhock, and cut flowers or entire plants of gladiolus and dahlia, except the bulbs thereof, without stems.”

Under the previous ruling the importation of corn other than the clean shelled grain was prohibited.

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An investigation is now being conducted to determine the amount of vegetables and flowers listed above, that are exported from the province of Ontario

into the United States under normal conditions. If it is necessary provision will be made for the inspection and certification of such shipments.

COMPENSATION FOR SLAUGHTERED ANIMALS

The Act to amend the Animal Contagious Diseases Act passed at the last session of the Dominion Parliament and referred to in the July-August number of *The Agricultural Gazette*, is not intended, as might be inferred, to terminate the granting of compensation for animals slaughtered on account of disease in May, 1924. The extension of three years provided in the Act has

reference to the augmented compensations paid for animals slaughtered, established by an amending Act passed in the spring of 1918. At that time compensations were increased from \$60 to \$80 per head for grade cattle; from \$15 to \$20 per head for each grade pig or sheep; from \$150 to \$250 for each pure-bred head of cattle and from \$50 to \$75 for each pure-bred pig or sheep.

REVISED CHARGES FOR TESTING SEEDS AND FEEDS

Due to the large increase in the number of samples received by the Dominion Seed and Feed Laboratories in recent years, together with the increased cost of operating the laboratories, it has been found necessary to revise the present testing charges. The Seed Commissioner, Mr. George H. Clark, announces that the following scale of charges came into effect from July 1, 1921:—

Purity test and grading.. . . .	50c.
Percentage purity test.. . . .	50c.

Germination test, ordinary seed supplies.. . . .	50c.
Germination test, florists' stock. . .	75c.
Microscopical examination of feeds.	\$1.00

The above charges will apply to all samples received. All samples forwarded for test should be accompanied by postal note covering the charges. This should be made payable to the Seed Commissioner.

As in the past, those who so desire may have the tests charged to their account, which will be payable annually.

PART II

Provincial Government Departments

VETERINARY BIOLOGICAL PRODUCTS

BY DR. C. D. MCGILVRAY, PRINCIPAL, ONTARIO VETERINARY COLLEGE

LITERATURE dealing with veterinary biological products is for the most part published in the form of scientific articles in professional journals, or as advertising matter in pamphlets issued by commercial concerns. In the case of the former they are as a rule not readily available for other than the professional person, and in the case of the latter they are in some respects misleading as the products are extolled commercially to such an extent as to create the impression that they are "cure alls" for every disease. As a result their proper use and benefit may not always be fairly estimated by others than the profession. In their general application biological products furnish a wide range of usefulness and, depending on their nature, may serve three distinct purposes, namely:—as diagnostic agents to detect certain infectious diseases, as immunizing agents to protect against certain infectious diseases, as therapeutic agents to assist in the cure of certain infectious diseases. The essential value of biological products in the detection, prevention and treatment of disease is based on the scientific phenomena associated with infection and immunity. By infection is meant the invasion of the body tissues with disease producing germs (micro-organisms) which multiply in the body and produce poisonous substances which may impair health or cause death. By immunity is meant the resistance which the body tissues offer to combat and overcome the invading disease germs,

prevent and lessen their ill effects, or counteract their poisonous products, thus protecting health and overcoming disease. This resistance to disease or immunity therefrom may be either natural or acquired. In the case of natural immunity it may be hereditary or inherent in a particular species of animal. For example, cattle are extremely susceptible to the disease known as Blackleg, while horses are immune to that disease. In the case of acquired immunity, it is the result of the animal having successfully withstood the infection or invasion of the body tissues by disease germs, or by the use of some special form of immunizing treatment. By means of biological products this immunizing treatment is possible and available for use to confer immunity on susceptible animals and thus protect them against certain harmful infections.

Having in view the fact that many of the real problems of animal husbandry are due to infectious diseases it is apparent that the use of veterinary biological products to live stock development must be encouraged towards promoting herd efficiency through the detection, prevention and treatment of infectious maladies. The list of biological products is becoming more extensive for each of these purposes and their value in promoting herd efficiency is becoming more fully realized. According to their nature they are grouped under distinct headings, namely, Vaccines and Sero-vaccines, Bacterins and

Sero-bacterins, Aggressins and Filtrates, Anti-bacterial Serums, Anti-toxins, Diagnostic Reagents.

Vaccines.—In the strict sense the term vaccine is applied to a biological product prepared in a laboratory by growing the living germs in suitable culture media and then attenuating or weakening them by special process if required. They are the oldest and best known group of biological products and furnish a reliable means of protection against certain infectious diseases destructive to live stock. Their beneficial effects consist in producing immunity through establishing a mild form of the infection and protecting the animal thus treated against subsequent natural infection. They should not be employed as curative agents as they are not suitable for treating the diseased animal. Among the diseases for which vaccines are most widely used to protect animals against are Anthrax, Blackleg, Hemorrhagic Septicemia and Contagious Abortion.

Sero-vaccines.—These are vaccines which are sensitized or modified by the bacteria being kept for 24 hours in the serum of an animal immunized against the same kind of bacteria. As the immune serum is rich in antibodies these adhere to the bacteria and sensitize the vaccine which may thus encourage a quicker immunity in the treated animal.

Bacterins.—These are also termed bacterial vaccines and consist of suspensions of killed bacteria in salt solution. They thus differ from true vaccines which are living cultures of bacteria, and generally produce a longer immunity than bacterins.

Sero-bacterins.—These are bacterins which are sensitized by means of immune serum. Bacterins are useful both as preventive and curative agents in certain diseases by stimulating the formation of antibodies or protective substances to combat the infection of the disease.

Aggressins and Filtrates.—These terms are applied to products which are germ free as a result of the bacteria being removed by filtering and the remaining filtrate or extract contains only the toxic substances produced by the bacteria. They are sometimes referred to as germ free vaccines but they are not true vaccines in that they do not contain the living germs as these have been removed by filtering, leaving the product germ free but still containing immunizing substances capable of affording a high degree of protection to animals against a fatal disease like Blackleg.

In the case of the products known as Blackleg Aggressin and Blackleg Filtrate, they differ in this respect, that the former is a filtrate of the tissue juices obtained from the affected parts of animals which have succumbed to Blackleg, while the latter is a filtrate obtained from cultures of the blackleg bacillus grown on special media in a laboratory. Both of these products have been found extremely reliable in protecting young cattle against blackleg and by their use losses from this disease can be prevented. Successful cattle raising has thus been made possible in many localities where blackleg has proved a serious hindrance.

Anti-bacterial Serums.—These are also termed immune serums, and consist of the serum of an animal which has been immunized with the organism of a specific disease. The usefulness of serums is based on the antibodies or protective substances which they possess. They produce an immunity of short duration and are also employed as curative agents. Hog Cholera Serum has been largely employed during recent years in the treatment of that disease and has encouraged the development of hog raising in many sections of the United States where hog cholera had prevailed extensively.

Anti-toxins.—These consist of the serum from the blood of an animal which has been immunized with the soluble

toxins of specific bacteria, as in the case of diphtheria and tetanus.

Diagnostic Reagents.—These consist of laboratory products which are used for the purpose of diagnosing or determining whether an animal is affected with a specific disease. Under this class is included Mallein used for the detection of glanders in horses and tuberculin to detect tuberculosis in cattle. These agents are the extracts from special culture media which is heated and filtered to destroy and remove the bacteria after growth is completed. They are therefore germ free products and cannot cause disease although possessing properties which induce a reaction when injected into animals with specific infection. They are harmless when injected into non-infected animals and produce little noticeable effect. When injected into animals having a specific infection they produce a marked effect or response which is termed a reaction. The nature of the reaction exhibited depends on the method of application and may consist of either a rise of temperature or a local swelling. As a result of the use of the Mallein test it has been possible to eradicate Glanders from horses in Canada. By the use of the tuberculin test the detection of tuberculosis is made possible and it furnishes the means by which this disease in cattle may be suppressed. There are three recognized methods of applying the tuberculin test which are known respectively as the Intradermal Tuberculin Test, the Ophthalmic Tuberculin Test, and the Subcutaneous Tuberculin Test. Each of these methods has a special advantage and they may be applied singly or in combination. The nature of the reaction exhibited depends on the method of application. In the case of the Intradermal method the tuberculin is injected into the layers of the skin on the un-

der side of the tail. The reaction effect produced in tuberculous animals is manifested by a characteristic firm swelling about the size of a walnut which persists for 72 hours. In the application of the Ophthalmic method the tuberculin is placed in one eye cavity. A preliminary or sensitizing dose is first given followed by a second or diagnostic dose. The reaction effects are manifested in a diffuse swelling, redness and a discharge from the treated eye, while the untreated eye remains unchanged as a control. The subcutaneous method is the method most commonly known and used. By this method the dose of tuberculin is injected beneath the skin. The reaction effects are manifested by a rise of temperature or fever reaction. Considerable skill and practice is required in the application and proper interpretation of any of these methods of the Tuberculin test, and should only be entrusted to the trained veterinarian. As a general rule high temperature reactions are to be considered as being more positive than low ones but the degree of temperature reaction or size of the local swelling should not be taken as a sure indication as to the extent of the disease because advanced cases may sometimes react less intensely than incipient ones. When an animal has given a distinct and positive reaction to tuberculin it should always thereafter be regarded as tuberculous.

Great credit is due to the Health of Animals Branch of the Department of Agriculture in Canada for the service it has rendered the live stock industry through the manufacture, distribution and use of biological products in the detection and prevention of disease. It is hoped that the efforts of the Branch may be further recognized by providing additional facilities with adequate staff which may be required to keep pace with the ever-increasing demands.

NEW YORK STATE EXTENSION SERVICE

Observations on a Trip to New York State to inquire into County Agent, Farm Bureau, and Boys' and Girls' Club Work

BY R. S. DUNCAN, B.S.A., DIRECTOR AGRICULTURAL REPRESENTATIVES FOR ONTARIO

DURING the latter part of June a party, composed of the Agricultural Representatives from the Counties of Prince Edward, York and Dufferin, the Assistant Live Stock Commissioner for Canada and myself, visited New York State to enquire into County Agent, Farm Bureau and Boys' and Girls' Club Work. We visited the Farm Bureau Office in ten counties, where we had audience with the County Agent, Home Demonstration Agent and Junior Extension Leader.

How the Extension Service Operates

The Extension Service, as operated in New York State, carries directly to the farms and homes the best available information regarding agriculture and home economics and secures its adoption in practice through the following agencies:—

- (1) *County Agricultural Agents*—who deal with farm problems;
- (2) *Home Demonstration Agents*—who deal with problems of the home;
- (3) *Junior Extension or Boys' and Girls' Club Work*—Comprising extension work with young people;
- (4) *Extension Specialists*—In various branches of Agriculture and Home Economics;
- (5) *Publications*.

At the time of our visit there were, in the State of New York, 55 County Agents; 14 Assistant County Agents; 27 Home Demonstration Agents with eight assistants; 3 County Home Demonstration Agents with three assistants; 16 County Leaders Junior Extension

Work with two assistants; 50 Extension Specialists or Subject Matter Specialists.

County Organization

The County Agent—called in Canada the Agricultural Representative—is the local Extension Representative, not only of the State College of Agriculture, but also of the United States Department of Agriculture and the people of the county.

A County Farm Bureau—which is an association of farmers and others in the county organized to develop and promote agriculture—has been formed to co-operate with the state and Federal Departments of Agriculture, in aiding the county agents in carrying on their work.

According to information received, one of the chief features of the County Farm Bureau plan is a representative membership, made up principally of the men of the farms, each paying a membership fee varying from \$2 to \$5.

The average number of farmers in the counties through which we passed was 4,800 and the average membership in the Farm Bureau, in these counties, was 1,063. This is less than one-fourth, or twenty-five per cent. We were also informed that approximately 60 per cent of the members renew each year. Of the \$2 fee, 50 cents goes to the state Farm Bureau Federation, 50 cents to the Federal Farm Bureau Federation and the balance to the county Farm Bureau.

The county Farm Bureau has an executive committee, consisting of a president, a vice-president, a secretary, a treasurer, and a committee of seven members elected at the annual meeting for a period of a year. The executive

committee meets monthly, secures necessary funds, authorizes expenditure of the Bureau's money, considers and approves programmes and projects and employs the county agents, who are approved by the state College of Agriculture.

In addition to the executive committee, local leaders or community committee-men, as they are called, are appointed. These men are usually the recognized leaders of the farm bureau's work in the community and develop the community programme.

Another of the outstanding features of the Farm Bureau system is that a definite programme of work for the year is laid out by the executive committee. This, of course, is based upon the results of a careful study of the agriculture and home problems of the county.

The county agent becomes the manager of the county Farm Bureau and is known as such amongst the farmers, rather than as county agent.

Each county Farm Bureau publishes monthly an 8-16 page paper called the "Farm Bureau News," which is practically self-supporting. It is distributed to the members only. The county agent acts as editor, and the time occupied in this capacity varies from three to six days per month.

Budget for County Agent Work

The United States Department of Agriculture and the New York State Department of Agriculture each contributes \$600 per year towards the salary of the county agent, the balance of the salary and expenses for the up-keep of the office, including services of stenographer, automobile rent, light, heat, furnishings, travelling expenses, advertising, etc., is secured locally, either from grants received from the County Board of Supervisors (in Ontario, County Councils) or from Farm Bureau membership fees. The average expenses of a county Farm Bureau vary

from \$5,000 to \$12,000, depending upon the programme of work.

Contrasting the two systems, Ontario and New York, it might be pointed out that in the former, where the average up-keep of an Agricultural Representative's office is \$5,500 or thereabouts, the provincial and federal governments each contributes approximately one-half and the county council only \$500. In New York State the federal and state departments of agriculture contribute but a small percentage of the total expenditures of a County Agent's office, the bulk of the money being secured from grants—\$2,000 to \$6,000—from the county board of supervisors.

Home Demonstration Agents

Wherever a Home Demonstration agent is located, a Home Bureau is organized, on a similar basis to that of the Farm Bureau, as a service for the farm women. The lines of work undertaken are such as the term "Home Economics" covers, including problems of health, food, clothing, housing, home furnishing and management in their relations to the welfare of the individual, the family and the community, and such other activities as the women themselves may determine.

The Home Bureau also has a membership, the fee being \$1 per year. The federal and state departments contribute in like manner to the salary of the Home Demonstrator, and the balance of the funds necessary to sustain the office is secured from the county board of supervisors. The Home Demonstration Agent is also called the Home Bureau Manager.

Junior Extension or Boys' and Girls' Club Work

A county board composed of the District Supervisor of Schools and equivalent representatives on the Farm and Home Bureaus directs the Junior Extension work in each county, and has general charge of all local clubs. The

board hires the Junior Extension Leader upon recommendation from the state Extension Department. The budget for carrying on the work is secured in the same manner as for the county agent and the home demonstration agent. Boys' and Girls' Club work, or Junior Extension work, as it is properly called, in New York State is developing rapidly. Ninety per cent of the enrolment is in the schools. The most important clubs are clothing, food, garden, potato, corn, poultry, calf, pig, and sheep clubs. Two of the most outstanding features of the club work in New York State are, first, that records are demanded in all projects and, second, that the boys and girls have the opportunity of taking part in team demonstration work in connection with each club or project.

Extension Specialists

There are approximately 50 Extension Specialists or Subject Matter Specialists, as they are generally called, on the extension staff of the State College of Agriculture, Cornell University, Ithica. These extension specialists are attached to the various departments, and are responsible to the professors or heads of such departments for their subject matter and to the Leader of the Extension Specialists for their programme in the field.

The travelling expenses of these specialists are paid in part by the Farm Bureau. They aid the county agents and home demonstration agents in their work, conduct extension schools in rural communities, hold conferences on special subjects, and lecture, part time, to the regular classes at the State College of Agriculture.

Observations

As the County Agent is hired by the farmers themselves and as the farmers contribute a cash membership fee, they naturally take a great deal more interest in his work than if he were hired by the State Department of Agriculture.

This plan, it is claimed, makes for maximum efficiency. It is recognized as one of the strong features of the New York State Farm Bureau system.

I am quite convinced that the plan of recognizing the community as the basis of work should appeal to practical thinking men. And, furthermore, I am more than ever impressed that the advisory agricultural council as tried out in a few counties in Ontario during the past winter is a step in the right direction. It is real co-operation we need in Ontario agriculture. One of the greatest objections to the Farm Bureau system is the difficulty of collecting the annual membership fee. As previously stated, approximately 25 per cent of the farmers in each county are members, and only 60 per cent renew membership each year.

While the Farm Bureau officers are supposed to be responsible for securing members, in many cases the county agent spends from two weeks to two months of his time on a membership campaign. This he cannot afford to do, as important extension work is neglected. In some counties a paid solicitor is engaged to secure membership fees. In one case the actual cost of collecting the fees exceeded the amount received in fees. Some other system of securing members may yet be devised which will relieve the county agent of this worry.

My observations would lead me to believe that county agents devote a considerable portion of their time to co-operative organization work and confine their activities to the older people—the farmers; whereas our agricultural representatives not only assist with co-operative organization work, but to a certain extent are subject matter specialists and devote a great deal of their time to boys and girls of school age and to junior farmers, as well as the older people. Our work in Ontario is essentially educational in character, whereas the county agents are devoting considerable time to assisting the farmers with their commercial problems—problems of buying

staple commodities and selling what the farmers produce. Demonstration and experimental work are carried on in much the same manner in New York

state as they are in Ontario, and those in authority state that the "show me" method is much more convincing than the "tell me" method.

THE WORK OF THE NEW YORK STATE COUNTY AGENT

BY W. R. REEK, B.S.A., ASSISTANT DOMINION LIVE STOCK COMMISSIONER

THE value of good roads is strongly impressed upon a Canadian visitor to New York State; the cost is overshadowed by the economic value for ease of transportation of products. Undoubtedly, their great development in the Empire State is largely due to the immense wealth concentrated in the cities which gather toll from the entire union.

Large markets near the point of production have encouraged specialized agriculture where the soil and climatic conditions were suitable and in other parts dairying has developed. Very few sheep are seen and a much smaller number of heavy horses per farm than may be noted in Ontario.

The County Agent appears to play a considerably different role than in Ontario. In comparison the Ontario representative system stands out as a strong educational system, whereas the New York organization is partly educational and partly commercial, with emphasis on the latter. They are engaged and paid principally by the counties; in no case does a county receive more than \$600 from the state and \$600 from the federal government. Their expenditures range from \$8,000 to \$12,000; consequently the farmers pay directly through Farm Bureau membership fees or through the county councils for the services of an expert. Under such a system it is quite natural to expect that the agent would have to attend to commercial activities. The work with the boys and girls is cared for by the assistants.

A staff of specialists supplied by Cornell University is always available to assist in any definite branch of agriculture. This is very commendable, because the activities of the College are carried immediately to the farmers. There is, however, no compulsion in regard to the agent making use of this assistance. Perhaps their staff in mechanics and gasoline engines are most in demand and their work so thorough and practical that the method might well be adopted.

The appointment of a Home Demonstrator in many counties is an excellent idea. The women should receive equal assistance with the men. Organization for dressmaking, cooking, canning, civics, recreation and other activities is carried on. The use of local women as leaders develops a great deal of local talent which might otherwise have remained dormant. Not every woman graduate is suitable to be a home demonstrator.

The report system adopted is a large factor in binding the agent to the extension department at the College, but the great amount of detail required must consume a large amount of time on the part of the agents.

The most interesting developments agriculturally are the building up of the large co-operative organizations and the methods employed in carrying out the plans. The sale of milk to the large cities by the people through their central organization, the caring for any surplus from day to day, and the binding contracts which men are signing by

thousands would convince even the most prejudiced that co-operation if properly conducted is an excellent method for the marketing of agricultural produce. The argument that near-by markets are prejudicial to co-operation is shattered. Many ex-county agents are to be found organizing and managing such enterprises, and no doubt the training received in the counties fits them for graduation in the larger fields.

That the agents as employed by the farmers are very well paid is a noteworthy fact and undeniable proof that the farmers believe the men who organize and care for their business should be well paid; consequently, many very able young men are attracted to the work.

Perhaps the outstanding facts to be noted are as follows:—

- (1) The great part played by the farmers in New York in management and financing;
- (2) The very slender connection with the Governments;
- (3) The opportunity for individualism in County Agents;
- (4) The staff of experts supplied by the College;
- (5) The Home Demonstrator;
- (6) The lack of central control of policy in New York State;
- (7) The greater return financially for individual effort;
- (8) The strength of the Ontario system as an educational factor.

THE EMPLOYMENT OF MOTION PICTURE FILMS FOR AGRICULTURAL INSTRUCTION

MANITOBA

MOTION Pictures have been adopted as an integral part of the agricultural extension work for the province of Manitoba. The pictures are used for two distinct purposes,—promotion and education. Under promotion might be included pictures intended to emphasize the importance of the various phases of the extension work such as demonstration team work, Boys' and Girls' clubs, ploughing matches, etc.

Two years ago the Pathescope Company of Toronto made seven 500-foot films in Manitoba under the direction of the Manitoba Department of Agriculture. These were "Judging the Dairy Cow," "Out With the Chickens," "The Gang Plow," "Injurious Insects," "Breed Types at the Brandon Fair," and "The Agricultural Society Fair." During the past summer two 1,000-foot films were made, one on "The Ploughing Match" and the other "Demonstration Teams." Four copies of these films were made and were kept constantly in circulation throughout the winter in

connection with the short courses and institute meetings. Judging from replies received in answer to an enquiry sent out immediately after the various meetings, the attendance was increased fully 50 per cent by reason of the pictures.

In addition to the Manitoba films, about twenty Ontario subjects and 12 of the regular standard pathescope films have been used and have given satisfaction. We are fortunate in being able to co-operate with the Dominion Live Stock representative in Manitoba and have been able to show a number of live stock films belonging to the Dominion Department of Agriculture to a considerable number of Manitoba audiences.

The Department owns nine Victor cinemas and three pathescope machines. Each lecturer takes with him a motion picture machine and six or seven films. He also takes with him a storage battery suitable for six-volt lamps, as we have found that the kind of storage bat-

THE AGRICULTURAL GAZETTE OF CANADA

tery which we can borrow is either too strong or too weak. When too strong, the lights are destroyed, and when too weak the pictures are not good. For the most part the puthescope machines have been used in the territory between the lakes, the difficulty of getting batteries charged being too great, as in some cases lecturers have been back as far as 45 miles from the railway, and it is at these points that pictures are appreciated most.

There are a number of community organizations in the province that own

Victor cinema machines, and occasionally films are sent out to these organizations. However, these organizations secure their films for the most part from Strains, Ltd., Winnipeg, as the department finds it difficult to spare films during the winter months, which is the period during which community organizations are most in need of films: A general regulation has been adopted that, where we send out films, at least two of the six shall be on agricultural subjects and two others on subjects of a distinctly educational nature.

SASKATCHEWAN

THE Department of Agriculture of the province of Saskatchewan announced recently that a Motion Picture Bureau was in process of organization. The Deputy Minister, Mr. F. H. Auld, makes the following statement in this connection: "The bureau will be a clearing house for the preparation and distribution of agricultural films of an educational nature. It is our

intention to co-ordinate as closely as possible not only the moving picture activities of the various departments and the university, but to plan with the other western provinces educational pictures which all three prairie provinces will be able to use and thereby reduce the expense below what it would be if each province were required to make original films of all necessary agricultural subjects.

QUEBEC

For the last thirty years, educationalists have been steadily endeavouring to improve the methods of teaching, to make them less dogmatic in character, more concrete, more lifelike and therefore truer and more logical. One of the happiest consequences of these endeavours is the teaching of agriculture by "sight," which is being done at the present time by a liberal use of illustrations, by tables, diagrams, and slides or moving pictures.

The latter method—the teaching of agriculture through moving pictures—has been introduced, and it looks as

though it would soon supersede all others. The educational value of the cinema has not escaped the attention of the Honourable Mr. Caron, Minister of Agriculture for the province of Quebec. An improved apparatus has been purchased lately, together with several films dealing with the improvement of field crops and illustrating the principal breeds of cattle. These have been successfully tried in a first series of lectures, and M. A. Desilets, director of agricultural teaching and organizer of lectures in the province, states that he is delighted with the results. Other films are being prepared.

A MOTION PICTURE BUREAU FOR NOVA SCOTIA

BY DR. M. CUMMING, SECRETARY FOR AGRICULTURE

THE Nova Scotia Department of Agriculture has established the nucleus of a motion picture bureau. The films used are in part local films, the scenarios for which were prepared by members of the departmental staff, and in part copies of films purchased in the main from the Ontario Department of Agriculture, which department has been very helpful in complying with requests for the purchase of duplicates of films prepared under the direction of its officials.

The arrangement under which local films were made was a joint one made between the Department of Agriculture and the Dominion Atlantic railway, which is a branch of the Canadian Pacific railway, whereby the Pathescope Company of Canada provided photographers whenever their services were required. The provincial Department of Agriculture, in addition to using the films that were taken particularly for its own use, also obtained the use from time to time of films taken under the direction of the Dominion Atlantic railway and vice versa.

The principal subjects illustrated in these films were as follows: "Growing of Silage Crops," "The Marketing of Wool," "Cream Grading; Why?" "Cow Testing," "Potato Growing," "Orchard Spraying," "Poultry Raising," "Local Scenes."

All the films at present owned were prepared by the Pathescope Company of Canada. The Department owns several of that company's motion picture ma-

chines, as does also the Dominion Atlantic railway. Both the foregoing managements have exhibited these films extensively at meetings held in various parts of the province. So far as the provincial department is concerned, the films have been used by different officials of the department as well as by field men of the Federal Department of Agriculture, with which department the provincial department co-operates in every possible way.

Local films are preferred, but films secured from other sources have added to the interest, not only because of their educational value in relation to any particular subject, but also because they have conveyed, in a most practical fashion, knowledge of agricultural methods adopted in other parts of the world.

All the agricultural officials who have used films are unanimous in commending their value. This is two-fold: first, they convey to the eye information which language alone could never convey; second, advertising the fact that films will be used at a meeting seems always to insure a larger audience than would otherwise be secured. The writer knows of only one objection to the use of films and that is the expense involved, a matter which must receive careful consideration in these days when economy of administration is very properly insisted upon by governments. It is our intention to continue and to extend this film service on a basis consistent with the finances of the department.

A LENDING LIBRARY OF LANTERN SLIDES

BY A. E. OTTEWELL, DIRECTOR, DEPARTMENT OF EXTENSION, UNIVERSITY OF ALBERTA

IN our Department of Extension we conduct a lending library of lantern slides containing approximately 250 sets. We have also a rental library of moving picture films of the Safety Standard type. We are now managing our own photographic and slide-making department. The photographer takes photographs of experiments which may be under way by the College of Agriculture or any other departments of the University and makes up the material into slides for use both within the University by instructors and also for use by borrowers throughout the province. The lantern slide service is free except for the payment of express. During the academic year closing June 30, approximately 125,000 people attended lectures given with the aid of lantern slides lent from our library; and about 25,000 people saw exhibitions of our moving pictures. In view of the numbers reached, I am of the opinion that

a lantern slide lending library is the cheapest form of extension service. The great difficulty is to secure good material to accompany the slides.

The lantern slides cover a wide variety of subjects which are divided into series under the following headings: Travel and Geographical, Industries, Agriculture, Natural History, Biography, Historical, Popular Science, Literary, Art, Biblical, Missions, Home and Foreign, Patriotic, Fairy Tales and Children's Stories, Social Work and Welfare, European War, and University of Alberta.

Special attention should be called to the preparation of a complete set of slides on Art for use in the schools, and to a series now in preparation covering Canadian History. This will be available for the coming school year.

The motion picture films are varied in character and are intended to be both instructive and entertaining.

MOTION PICTURES, LANTERN SLIDES AND GATE SIGNS IN CAMPAIGN FOR BETTER SIRES

BY J. E. RETTIE, ASSISTANT LIVE STOCK DIRECTOR, ONTARIO DEPARTMENT OF AGRICULTURE

THE ultimate object of the campaign for better sires is to improve the quality of the beef and dairy herds of the country. To achieve the object it is necessary, first, to create in the minds of farmers an interest in and a desire for a better class of cattle. This cannot be done by writing and talking alone. The ideal way to create this interest would be to have the people see numbers of good cattle. As this is seldom practicable, the next best thing is the use of good pictures. It is in this direction that we have found motion pictures useful. If you can show an audience a number of reels of high class cattle, you secure their interest immediately, and when shown in pastures similar to the pastures in their

own fields, the appeal is very strong. Wherever such pictures have been shown, it has resulted in a number of the audience making enquiry about breeding, feeding and methods of caring for cattle to obtain the best results.

Motion pictures are not well adapted for making studies of type. It is in this connection that we have found lantern slides valuable. The slides we have used have included close-up pictures of ideal representatives of all breeds contrasted with slides of undesirable and unprofitable types. One of the most interesting is a series showing a number of scrub cows, the good bulls to which they were bred and the resulting calves. This is the next best thing to having the animals actually

there. In brief, motion pictures secure the attention of the audience and create a desire for more information; lantern slides illustrate types and methods. Motion pictures made on Ontario farms have been used to illustrate the leading beef and dairy breeds. Wherever possible, groups of animals by one sire are included to show uniformity and high standard of breed type.

It is proposed to prepare a picture of market animals showing different grades. Some examples of grade cows of poor to fair quality with their calves by high class bulls, showing marked improvement in one generation by the use of a good sire, have been secured. It is hoped to secure more of these as they are the very best of object lessons.

The Use of Gate Signs

In an educational campaign there are a number of essentials one of which is to create an interest in the minds of those you wish to influence. It is not an easy matter to reach the man who most requires instruction. Bulletins and other literature sent to him often find their way into the waste

basket unread. He is not easy to get out to meetings where the matter is to be discussed. The main object in using these signs is to reach the man who does not read bulletins or attend meetings. When he sees a sign on his neighbour's gate announcing the fact that a pure-bred bull is kept on that farm, it starts him thinking. If every farm where a pure-bred bull is kept is indicated in this way, natural curiosity will as a rule lead a man to make inquiries. Such an individual will probably have been claiming that his grade bull is just as good as the pure-bred, but he soon realizes that if he keeps a bull and has no sign up stating that it is pure-bred, the inference is that it is inferior.

The spirit of "Keeping up with the Joneses," while it may in some cases cause discomfort, is a real factor in human progress. When you get a man in a receptive frame of mind, you have accomplished considerable; in other words, you have fertile soil. The mission of the gate sign is to create interest, and in this it is succeeding in a great measure.

EXTENSION ACTIVITIES OF MACDONALD COLLEGE

AGRICULTURAL extension work carried on by Macdonald College is looked after by the individual branches of the college rather than by a separate division as is the case in some of the provinces. The work is designed to promote the prosperity of the province through live stock, field crops, horticulture, poultry, women's work and the rural school.

Animal Husbandry.—The promotion of the sheep industry in Quebec province has been the major feature of extension work in animal husbandry. Assistance has been given in the developing of sheep and wool clubs and through them the sale of wool and the

distribution of pure-bred sheep. Recently these activities have been directed by the Dominion Wool Growers' Association and the Dominion Live Stock Branch. Some of this work has been continued in a co-operative way, through assistance at sheep demonstrations and sheep breeders' meetings, but owing to lack of funds it has not been possible to launch any new work.

Cheviot sheep have been introduced and distributed through different sections of the province with the result that the breed has gained quite a foothold in Quebec and largely from this province the Cheviot has found its way into practically every province in the Dominion.

Other extension work is confined to what might be called the "field work" of the various members of the department. This work is not centred in any single feature but serves as a means of contact between the department and the various farming interests with which it has to deal.

Cereal Husbandry.—The extension work of the cereal husbandry department is directed along lines of popularizing information obtained relative to crops and varieties and in co-operating in the general campaign for the improvement of the seed supply in the province of Quebec.

The value of fall rye is being emphasized. On the experimental grounds this crop has demonstrated its adaptability both as to winter resistance and productivity. This information has been supplemented by the experience of a number of farmers in various parts of the province. By means of acre blocks of fall rye the possibility of growing this crop and the fact that it is a really high yielder are being demonstrated in a number of sections.

The question of a satisfactory variety of corn for silage purposes is of importance and more particularly so in those districts where the season tends to be short. The department having through its tests determined that the best combination of yield and early maturity is at present found in North Western Dent Corn, this variety is being made known to farmers in a number of districts. This is being accomplished by means of general publicity and by field demonstrations which this year approximate fifty.

The study of oat varieties has demonstrated that the Alaska Oat combines quality, i.e., low per cent of hull, and yield, to such an extent that it is a very excellent oat for some sections, the additional characteristic of very early maturity usually adding materially to

its value. This variety was introduced in the province through the cereal husbandry department and is being followed up with the object of not only making the variety better known, but also that of establishing a good seed supply.

The department is assisting in the general campaign being conducted to improve the seed supply in the province. The greatest effort is in the co-operative arrangement with the Quebec Department of Agriculture and the Quebec Co-operative Society of Seed Producers whereby pure seed is being produced for distribution of seed centres. The work of production is being conducted by the cereal husbandry department on the land owned by the Co-operative Society at Ste. Rosalie Junction, P.Q., and financed by the Quebec Department of Agriculture. As soon as this project is fully organized elite stock seed is to be produced and will be distributed to seed centres, the product of which will assure the Co-operative Society and the farmers of the province a good supply of registered seed. This project is specially noteworthy, as it connects the organizations, working toward the improvement of the seed supply. Through it the department of agriculture, the college, and the farmer are making a united effort. With such co-ordination the improvements obtained will be much more rapid and stable.

Naturally, general extension work is being conducted by the department of cereal husbandry. However, the effort is not in general lines but is made more specific as solutions are found for the problems that present themselves and as superior material, in the form of new varieties or strains, becomes available.

Horticulture.—The extension activities carried on by the horticultural department during recent years have been limited owing to the nature of the work at the college which requires the major part of the time of the staff.

There is great need for extension work in this province among the fruit and vegetable growers, especially to carry to them better methods in the culture of their crops, in the better choice of varieties, in the use of manure and commercial fertilizers, in the control of insect pests and fungous diseases, etc., and in order that this work be effectually undertaken it would require extensive field demonstrations and experiments and require the services of one or more men constantly on the work rather than as at present intermittently as opportunity affords.

The following are some of the activities in extension work which are being given attention by the department:

Spraying experiments and demonstrations in connection with the control of diseases and insects, of the apple and potato, and in the control of onion smut.

Field experiments in the control of the onion and cabbage maggots.

Encouragement is given in the cultivation of small fruits.—Plants of good varieties of strawberries and raspberries have been sent out, for trial, to various places in the province. Strawberries, raspberries and plants of red and black currants have been sent to the Boys' Farm at Shawbridge, where these fruits are to be grown on a large scale in connection with the farm work in educating the boys along agricultural lines. Similar distribution of plants has been made to many returned soldiers who have taken up land in the province.

Improvement of the grounds of rural and town schools and academies and also a few churches. Plants of trees, shrubs, vines and perennial flowers have been sent to about 30 schools and four churches. Of these, at a number of schools the plants have been well cared for and a considerable improvement has been made in the appearance of the grounds. At some places little care has been given the plants and they

have been trampled on, grazed by animals or allowed to grow up in grass. This work could be made a strong educational feature at many schools but would require to be followed up carefully by frequent visits to give supervision to the plantings and instruction to the teacher and pupils.

Distributions of plants, bulbs and seeds of flowers and vegetables have been made to school children in the rural sections of the province. Liberal packages of seeds or plants have been sent to as many as 5,000 children in one year. This work has been entirely taken over by the Quebec Department of Agriculture during the past year.

Lectures and demonstrations have been held at various centres in the province and judges have been provided for many exhibitions. Advice on a variety of subjects is given by correspondence and through visits to the more important sections of the province.

Poultry.—For a number of years the poultry department of Macdonald College has been doing considerable extension work, as shown by the following list of the chief lines of work.

1. Considerable literature has been circulated, including bulletins, leaflets, circulars, and blueprints of buildings, appliances, and trap-nests.

2. The following numbers of sittings of hatching eggs have been distributed to school children, free of charge: in 1913, 100; in 1914, 425; in 1915, 610; in 1916, 541; in 1917, 658; in 1918, 892; in 1919, 740; and in 1920, 750.

3. School Fairs: The following numbers of school fairs have been held: 1913, 3; 1914, 9; 1915, 14; 1916, 13; 1917, 21; 1918, 24; 1919, 25; 1920, 32.

4. Community Breeding Centres. Several demonstration flocks serve as a source of supply for eggs for school fairs and as community breeding centres in the distribution to the surrounding community of eggs from im-

proved flocks. In these flocks there are used as male breeders only pedigreed bred-to-lay cockerels from Macdonald College. The flocks are inspected twice a year and are culled in the fall.

5. *Demonstration Poultry Houses.* Six demonstration poultry houses were erected in 1913 at various places in the English-speaking sections of the province. Using these houses as models, a large number of houses have been built by farmers.

6. *Demonstrations and Lectures.* A large number of demonstrations and lectures have been given at meetings of poultry associations and farmers' clubs, the chief emphasis being laid upon the fattening and dressing of poultry for market and the selection of breeders and layers.

Quebec Women's Institutes.—The work of the women's institutes in the Province of Quebec is carried on by a staff of extension workers sent out by the School of Household Science, Macdonald College. These women's institutes, fifty-five in number, are almost entirely in the rural districts. They are assisted by these extension workers in organizing, and taught how to conduct their meetings and work. Demonstrations in household problems are given; also lectures on topics of interest—thus helping to realize their motto "For Home and Country."

A circulating and clipping library has been started at the college, from which any member, upon application, may receive information for her papers or talks. This the women find most helpful, and constant inquiries come for material on different subjects.

The women's institutes with a membership of over fourteen thousand, and this number is increasing steadily, have progressed in their work to such an extent that they now have their own provincial organization, which furthers and strengthens their work.

Such problems as child welfare, better schools, agriculture, community im-

provement, etc., as well as matters pertaining to the immediate home are taken up and studied by the institutes at their monthly meetings, and where possible, put into practice.

Women are realizing and appreciating the advantages obtained from this organization, and the work is rapidly growing.

Rural Schools.—All of the energies of the rural school department are devoted to extension work with the pupils in the Protestant schools of Quebec province, although certain relations with adults are necessary in order to bring about new movements. The department was formed in 1915 and the first year was spent in instructional and survey work of an agricultural nature. In 1916, the management of the school fairs for English-speaking children was given to the department, and from that time until the fall of 1920 the entire time of its members was spent in endeavouring to make a success of that work.

School fairs vary greatly and may be organized and held with very little or very great work attached. Directly proportionate with the work is the amount of good derived from them by the children. The rural school department endeavoured to carry personal instruction and a personal interest to every child. This took a large amount of time and made it impossible to reach as many children as could have been reached had other policies been followed, but the returns decided those in charge to work intensively.

In the fall of 1920 the Provincial Government took over the operation of all school fairs in the province. During 1921 this department, which, because of lack of funds, is limited to one person, has been engaged in an exhaustive survey of social conditions, and in an effort to improve the nature of the agricultural instruction in our public schools. It is hoped that in the fall of 1921 a new line of work will be under way which will have a strong influence on the lives

of the teen age and younger boys and girls.

Short Courses of Instruction.—Macdonald College, in addition to the regular courses, provides short courses of study during the winter months in agricultural engineering, animal husbandry, cereal husbandry, horticulture, poultry and the farm home, and carries on similar courses at different centres in the province. It also provides a summer school for rural improvement for country clergymen and others interested in rural welfare. The purpose of this latter course, which is usually held during the

first two weeks of August, is to give instruction and inspiration to the rural minister and all others interested in country life who devote all or any part of their time and energy to the advancement of the rural community. Instruction is given by members of the staff of the institution, and recognized theological and social science authorities upon the essential problems of rural communities—sociological, recreational, and economical—as well as elementary instruction in those branches of agriculture which are most needed by the country minister.

EXTENSION WORK OF THE NOVA SCOTIA AGRICULTURAL COLLEGE

BY DR. M. CUMMING, PRINCIPAL

THE educational work of the Nova Scotia Agricultural College may be divided into three divisions: Instruction, Demonstration and Investigation. Each of these divisions is more or less involved with the other so much so that in treating with any one division one is bound to consider to a certain extent any other division of the work.

The main course at the Agricultural College, Truro, is a two-year course consisting of two terms each of six months duration. In addition, certain of the staff teach in the Rural Science School for Teachers which is conducted during a five-week period in midsummer. Even including the summer work, the regular college programme leaves considerable time both in winter and summer in which the various members of the staff may devote their attention to extension work. It consequently happens that the extension service of the Nova Scotia Department of Agriculture is largely under the direction of the members of the staff of the Nova Scotia Agricultural

College who carry on part of the work themselves and who direct the balance of the work either through county agents or special employees.

Instruction

The special Farmers' Two Weeks Short Course held at the college annually in the month of January and corresponding Short Courses held in March for Dairymen and Short Courses in Household Economy held at various seasons of the year, may be regarded as largely in the nature of extension courses, for in the main, they are attended by a class of students who either have not the time or the qualifications for taking a regular course.

The college staff, usually assisted by members of the Dominion Department of Agriculture, annually conduct from five to ten short courses of from three to five days' duration each at various centres in the province. In order to make these short courses as efficient as possible, the department has co-operated with eight communities to erect agricul-

tural buildings especially suited for the conducting of large short courses. The courses conducted in these buildings have been largely attended and have been signally successful, whereas courses attempted in improvised buildings, that were not suitable for the purpose, have not proven as successful.

In addition to short courses, educational meetings are held in the various counties of the province, but, in the main, these are conducted only when some special propaganda such as Dairying, etc., is being put forward.

Demonstration

Demonstration work has been carried on in special communities of the province where it was regarded that such work would prove effective. For example, for a number of years demonstrations in the best methods of growing turnips were conducted in a large part of eastern Nova Scotia where the growing of this crop had been neglected. Similar demonstrations were conducted in potato growing, potato spraying, the use of fertilizers and ground limestone, sheep dipping, etc. It has been found much more effective to carry on this demonstration work on the farms of selected farmers under average conditions than to do it on a so-called "government" or "model farm." Sometimes this demonstration work has been done by members of the college staff, but more frequently by county agricultural representatives directed by the heads of departments on the college staff.

Investigations

Partly with a view to determining results under ordinary farm conditions and partly with a view to making certain lines of investigation to partake of

the nature of demonstration, a considerable amount of the investigation work in insects, plant diseases, fertilizers, including lime, has been conducted on farms throughout the province. Usually this work has been checked up by similar work on the college farm so as to insure its scientific exactness.

General Measures

Any extension service must be adapted to the community in which it is conducted. Hence it has transpired that, although most of the extension service of the Nova Scotia Department of Agriculture may be included under the foregoing, still, in certain parts of the province, it has been deemed wise to go further and assist farmers more definitely in certain marketing and other problems. Along this line the Nova Scotia Department of Agriculture now operates three large creameries and a cereal mill in eastern Nova Scotia. Lime crushers have also been operated, although this work has now been concluded. These tangible efforts have afforded the Department an additional opportunity of conducting instruction and demonstration work in the communities that were being served, but, of course, they were quite uncalled for in other communities where such services were better conducted through private enterprise.

Extension work is gradually being introduced through the Rural Science Division of the Department of Education into the common schools of the country, and it is hoped that this branch of extension work may be further and further developed, as it is fundamental in character and will ultimately lead to the dissemination of agricultural education into almost every home in the country.

CONFERENCE OF ONTARIO AGRICULTURAL REPRESENTATIVES

THE fourteenth annual conference of the Agricultural Representatives of the Ontario Department of Agriculture at the Agricultural College in July is reported to have been the most satisfactory of any hitherto held. Practically two and a-half days out of the four were taken up with committee meetings and reports of committees so as to give full scope to the bringing forward of suggestions and recommendations bearing upon the work engaging the attention of these local representatives of the department. A synopsis is presented of these reports insofar as they relate to matters of more or less general interest.

Live Stock Improvement

The committee on Live Stock Improvement reported that in their belief the time had arrived for legislation to assist in the campaign for Better Sires, and recommended that legislation be prepared covering the following:

1. To make it compulsory for township councils to take by their assessors an annual census of bulls and, if practicable, pure-bred stock.

2. To make it an offence to permit bulls to be in fields or areas not bounded by a definite sort of fence.

3. To make it illegal to collect service fees for grade bulls.

The Committee also made the following recommendations:

1. That a bonus, 20 per cent of the cost price, be made payable on application to those who buy a pure-bred bull for the first time. Such animals should be subject to the approval of the Live Stock Branch; a maximum price of say \$250 would probably be advisable.

2. That all the cattle being offered in sales which expect to receive the government grant be inspected.

3. That freight on car or half car lots being shipped to market be continued.

4. We suggest an exhibit of three, a good pure-bred bull, an ordinary grade cow and the offspring of these two, to be compared with three of the other class, namely a similar kind of cow, a scrub bull and a calf resulting from the mating of these two, such exhibit to be sent to a number of county fairs.

5. For the smaller fairs, we would recommend the preparation of a real exhibit to include projected pictures and first-class charts, etc. An exhibit of this kind should outclass any similar feature in the fair in order to be worth while.

6. Feeling that there is an immediate and permanent need of a bulletin or other publication on the "Principle of Breeding," we urgently recommend that the Live Stock Branch undertake the preparation of a publication dealing with the subject as simply as possible, the same to be well illustrated by many pictures, diagrams, charts, etc. These latter could be utilized as slides and lecture charts.

7. As we have found that where gate signs have been sent out in considerable numbers, they are appreciated and being asked for, we would recommend that the department continue supplying same.

With respect to the campaign for better sires, the committee considered that the work should be undertaken in smaller territorial units with a local committee in charge of each, and that the procedure should include well advertised meetings addressed by live stock experts and illustrated by motion pictures followed by press notices. Also that efficient follow-up work be instituted whereby every farmer keeping a "scrub" bull should be personally interviewed.

Improvement of Swine

The committee on Swine Improvement reported that, in their opinion, it would be in the best interests of the swine industry of Ontario if market hogs were paid for on a graded basis, the standard grade to be the bacon hog, and that a committee composed of representatives of the producers, the packers and the Department of Agriculture be formed to devise a basis for the establishment of grades and the operation of grading. Also, that as soon as possible the government provide for grading demonstrations at shipping points in accordance with the demands of the industry.

Judging Competition

The Judging Committee expressed its approval of the proposed courses and competitions to be conducted jointly by the provincial Department of Agriculture and the Educational Committee of the Canadian Swine Breeders' Association. It was recommended that, for this purpose the province be divided into six districts, and that during the month of December, three-day courses be held at selected points in each district. The programme recommended was as follows:—

First Day

A lecture and demonstration on Curved Sides;

A lecture and demonstration on Carcasses;

Lecture and demonstration on Judging Live Hogs.

Second Day

Inspection trip through packing plants;

Inter-County Judging Competition—teams composed of nine Junior Farmers;

Judging Live Hogs:—

(a) Judging 6 pigs of bacon type (written and oral reasons);

(b) Judging 4 pair bacon hogs (written and oral reasons);

(c) Judging 4 groups of 6 hogs each (placing only);

Lecture and Demonstration, Diseases and Meat Inspection, Representative of Health of Animals Branch, Ottawa.

Demonstration and Judging and Grading of Carcasses.

Third Day

Judging of carcasses of hogs judged on day previous:—

(a) Judging and grading carcasses, 6 pigs bacon type (written and oral reasons);

(b) Judging and grading carcasses, pairs bacon hogs (written and oral reasons);

(c) Judging and grading of carcasses of groups of hogs (placing only).

Poultry Breeding Stations

The committee on Poultry Stations endorsed the plan of distributing improved poultry throughout the province by means of these stations, and recommended that each Representative establish a sufficient number of stations in his district to supply all eggs for school fair purposes. Wherever possible, these should be within a 20-mile postal radius of schools taking eggs.

The committee reported that after observing the results of charging the pupils full value for eggs, they recommended that this system be continued. This was not to apply to the newer districts. Also that where pupils failed through no fault of their own, a system of compensation should be instituted. It was further recommended that it be arranged for station operators to send in complete and accurate records. Properly kept records would furnish valuable information on costs, breeding, etc.

Junior Farmers' Improvement Associations

The committee on the above revised the constitution of these associations and made a number of minor changes

FARM BUSINESS SURVEY IN ONTARIO

BY H. C. MASON, B.S.A., FARM ECONOMICS DIVISION, ONTARIO AGRICULTURAL COLLEGE

THE first farm business survey in the province of Ontario was made in Caledon township, Peel county, in the fall of 1917. This small survey, covering 113 farms, was the first systematic effort made in Ontario to secure authoritative information and figures upon the farming industry as a business proposition.

In the spring of 1918 a much larger survey was made, covering 437 farms in Oxford and 340 farms in Dundas. The sections surveyed were the foremost dairy districts of western and eastern Ontario respectively. These surveys were continued in the spring of 1919; after that time the Dundas work was dropped, but the Oxford survey was continued until the spring of the present year. The work was extended still further in the spring of 1919 to cover the beef-producing industry of North Middlesex and mixed farming in parts of Wellington, Dufferin and Peel counties. The year 1920 saw a continuation of the above surveys, together with a special investigation in York county into the cost of producing milk for the Toronto market. An initial survey of the apple-growing and mixed farming area of Durham county was undertaken in the same spring. Work was also commenced upon the cost of producing tomatoes for market in the Niagara district, and later a complete survey of 178 fruit farms was undertaken in the same section.

This year's work has been even more extensive than that of previous years. The Oxford, Middlesex and Durham surveys have been continued, and a new investigation has been started into the particular type of mixed farming followed in Kent county in the south-western part of the province. Much work has also been done upon the cost of beef production in western Ontario, in relation to freight rates, and the find-

ings of this investigation were recently presented before the Railway Commission. Reports upon the results of these surveys are already in print or will be issued shortly.

An important branch of the work of the department is the introduction of a system of cost accounts. Representative farmers in Oxford, Dufferin and Durham, numbering in all about 75, are keeping full accounts of everything connected with the farm business under the personal direction of the department's specialist in cost accounting. This work is expected to bring out some extremely interesting and valuable facts and figures, and at the same time to be of great benefit to the farmers engaged in it.

Another undertaking which is about to be embarked upon is the investigation of markets, marketing conditions, and co-operative enterprises. Under present conditions there is a very great demand for work along these lines, and this branch is expected to develop as rapidly as has the farm survey proper.

The value of the work of this department cannot yet be estimated. Already it has secured and made available information of great value to the farmer in the organization of his business, whether he is interested in dairying, beef-raising, fruit-growing, or any one of the several types of mixed farming. It is taking up the work of training the future agricultural leaders of Ontario as analysts of farm business. With the development of the work in cost accounting and marketing its value to the farmer will be even more manifest. When the producer knows the cost of production, the cost of marketing, and what methods of production and marketing are working out most economically in actual practice, he will be in a position to appreciate the work of the Farm Economics department.

A SASKATCHEWAN SOIL SURVEY

IN accordance with the recommendations of the Royal Commission appointed to enquire into the condition of the farming industry in the Province of Saskatchewan, the University is proceeding with a reconnaissance survey of the province.

Dean Rutherford, who was Chairman of the Commission, reports that during the first week in June, Professor Roy Hansen, of the Soils Department, with two senior students, left Saskatoon for the southwestern part of the province to begin work. The work this year is in a large measure of an experimental nature as the type of survey being made is a little different from the detailed surveys that are being conducted in the several States. It is intended to locate the large soil areas and to determine the boundaries of various soil types. Soils that cannot be determined accurately in the field will be sent to the laboratories at the University to be worked out during the winter time. Samples will also be sent in to the laboratories in order that the field determinations may be verified. Good progress has already been made, according to reports that have come in from Professor Hansen.

In addition to the soil survey, it is intended to make a fairly careful survey of the farming methods and operations prevailing in the district. This will not be a detailed farm management survey but rather a historical one, in order that there may be information at hand that will enable the University and the Department of Agriculture to determine methods that may lead to a more profitable, productive and permanent agriculture, especially for southwestern Saskatchewan. What is being done in the southwest will be done also in other parts of the province, until the whole area has been covered.

The method of carrying on the work next year will be based largely upon the experiences of this year. It is alto-

gether likely that more than one outfit will be engaged in the work in 1922, though this will be determined later.

Professor Hansen states that the work will consist of the examination of soils in the field by trained men. Maps will then be prepared showing the boundaries of the various soil types, the quality of the soil and the system of farming recommended. Sub-soils will be examined, since the power of a soil to withstand drought is in a large measure dependent upon sub-soil texture. A very careful study of the conditions affecting the various districts will be made, this study to include meteorological conditions, kinds and varieties of crops suitable to the area, crop rotations, the soils, the livestock situation, practices in vogue, etc. By a careful analysis of all the factors, it will be possible to point out the reasons for success or failure by which the farmer may be guided.

While the first aim will be to assist the farmer, other and secondary benefits will result. Schools, particularly where agriculture is taught, will find the information obtained from the soil survey of great value, both for purposes of teaching and for carrying on investigational work. The Agricultural College at Saskatoon, has especial need for this project. Where soil or climatic conditions vary, and it is found necessary to establish experimental farms to work out the problems of the community, the survey will show the type of soil characteristic to the district, and will assist in the selection of a representative tract. Banks, credit companies, insurance companies and other agencies directly or indirectly interested in agriculture, will unquestionably find the project very useful. A better understanding on the part of the financier or business man of conditions under which the farmer is working should greatly assist such organizations.

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In countries like the United States, where similar investigations have been conducted over wide areas, it is found that the reports furnish no small part of the working knowledge of the county agents. The same is true in the province of Ontario in so far as surveys have been

completed. Information on Saskatchewan conditions will in a like manner be available to agricultural representatives. These the provincial agricultural department intends to establish, it is stated, as soon as practicable on a much more extended scale than hitherto.

AN AGRICULTURAL SURVEY IN THE PROVINCE OF QUEBEC

AS a preliminary step to a comprehensive study of the various problems of the farm, and in order to enable official agronomists to better shape their programme and do more efficient work, a thorough survey of the various methods of culture has been undertaken by the Quebec provincial Department of Agriculture. This survey was put in charge of a practical farmer, graduate of the school of agriculture of Ste. Anne de la Pocatière, Mr. C. Gagne, licensed in agricultural

science from Cornell University. Mr Gagne is now working, with the co-operation of local district agronomists, in a few counties below the river St. Lawrence, and, later on, the survey will be extended to other districts.

The agricultural survey planned by the Department includes a complete inventory of each farmer's personal and real estate; this inventory to be used at the end of each year to establish the net value of his assets.

COMMUNITY PACKING AND MARKETING OF APPLES

BY REVEREND FATHER LEOPOLD, DIRECTOR, OKA AGRICULTURAL INSTITUTE, LA TRAPPE, QUE.

COMMUNITY packing of apples is an important feature of many co-operative marketing associations that handle the fruit with success. Community packing, in charge of competent and disinterested men, makes it possible to secure uniformity in grading and packing the product of the members' apple orchards. Attractive labelling of the packages is an added feature in many instances.

Community packing and grading is correct in principle, but how are we going to work it out? If I might suggest a practical way, it would be to divide our fruit districts in so many

divisions, with a central packing shed in each, to be used for packing the apples grown in that division. For instance, take centres like Rougemount, St. Hilaire, Covey Hill, Abbotsford, Châteauguay, St. Joseph du Lac, in the province of Quebec. In the most of these centres the government spends money every year demonstrating the best methods of producing high quality apples. It is time now to spend the same amount in teaching the growers practical means of grading and packing their apples, and there is no better way of undertaking this than through community packing, which I advocate.

There is no use in speaking of one central packing house for the whole society, as we could not economically ship our apples to the one place for grading and packing. This would be much more simple but is impossible to attain in our scattered sections. But if one central house is not practicable, that is no reason to abandon the community packing idea. The solution is to build more houses. These packing stations need not be elaborate. All that is needed is a room to receive the apples as they come in, a packing room and a grading outfit. The house might well consist of a two-story building. It is not even necessary now, at least, to have a storage house, as the apples could be sent after packing to the Co-operative Centrale in Montreal, where there is every facility to store and handle the fruit. There is no difficulty whatever in disposing of

fruit that is well graded and packed. The difficulty always comes from the fact that the fruit coming in is packed in all sorts of ways, arriving very often slack and in a more or less bad condition.

The supervision of packing stations by inspectors or agents of the provincial government would then be an easy task. It would be their duty to see that the fruit sent in was properly graded and packed. In order to secure uniformity of grades, it would be necessary that pickers, graders and sorters should follow well-defined rules in picking and handling the apples in the orchards as well as in the packing houses.

The problem of marketing requires that the manager of the co-operative concern, as early as practicable in the season, should make a careful estimate of the production in the various districts.

BETTER FARMING TRAINS TOUR SASKATCHEWAN

DURING the month of June a Better Farming Train was run as in former years under the administration of the Department of Agriculture of the province of Saskatchewan. Sixty-five points were visited with a total attendance of 32,774 men, women, boys and girls. This train was made possible by the co-operation of the Canadian National Railway, the College of Agriculture of the University of Saskatchewan and the Department of Education.

The railway supplied the rolling stock and moved it from point free of charge to the Government. The College of Agriculture equipped the exhibit cars with live stock, display of machinery and farm mechanics, field crops, poultry and dairy exhibits. Also manned these various sections of the train with lecturers and students as attendants in exhibit cars.

The Boys' and Girls' lantern car was looked after by representatives of the Department of Education assisted by officials of that department. School Hygiene work was looked after by that branch of the Educational Department, while the Domestic Science Section and Nursery Car were staffed by outside help selected by the department. The staff of the train averaged about thirty, and arrangements were made with the railway as in former years for sleeper and dining car to be attached to the train.

This year an innovation was introduced in having the tree planting car of the Canadian Forestry Association attached to the train, and lectures by the men in charge proved to be a valuable addition to our programme.

Agricultural Instruction Train

A second train, known as the Agricultural Instruction Train, was operated

over Canadian Pacific railway lines in the southwestern part of the province during July. This was really a "better farming train" in miniature, the subjects dealt with being confined to live stock, dairying and field crops. Twenty-four meetings were held with a total attendance of over 4,300 persons.

Scrub Sires Exchanged for Pure-bred

One of the successful features of the train was the carrying of cars of pure-bred bulls of the leading breeds for sale

and exchange. These were sold to the farmers on credit terms, scrub sires being taken in part payment and removed. Twenty-one bulls were placed during the trip, and valuable demonstration work was done along the entire route by the carrying of such a variety of sires of the different breeds. Much interest was taken in the dairying lectures, and the work of cow-testing was greatly stimulated, farmers at practically all stops deciding to take this important step in building up their dairy herds.

AN INSTITUTE SCHOOL FOR COMMUNITY LEADERSHIP

BY G. A. PUTNAM, SUPERINTENDENT, WOMEN'S INSTITUTES OF ONTARIO

THE Women's Institutes of Ontario are the study centres, social as well as educational, of the home-makers of each community. Here in monthly gatherings which are non-sectarian, non-partisan, and recognize no class distinctions, they consider together how to attain better homes, better people, a better community, a better and happier social life, and a better and more scientific agriculture.

Within the rules, they are self-governing, the monthly programme being planned and carried out by the members themselves with the aid of suggestions from the Institutes Branch of the Department of Agriculture through the handbook and lecture staff.

The basic principle of action is co-operation. The women and girls of a community co-operate with each other in the branch institute; the branches co-operate in a district organization; also provincially in the annual conventions. All co-operate with the Institutes Branch of the department, from which they receive regular and efficient help in literature, lecturers, demonstrators, short

courses, and, through the colleges, loan material for the preparation of papers and demonstrations by the members themselves.

Through this simple, direct, and practical working trinity of the home-maker, college and department, remarkable results have been quietly achieved in the last twenty years. This machinery affords the medium by which the best services of all departments of the state and the results of college research can be put at the command of the home-maker in even the remotest parts, wherever the home-makers choose to organize. Over nine hundred points have so organized in rural Ontario.

The greatest obstacle to thorough and efficient organization has been the lack of leaders. Theoretically, every member in the branch institute takes her turn and does her bit in holding office, acting on committees, taking part in the programme, social and educational, and in the various general activities for the promotion of community welfare. Actually, while many do this, many others hold back. The cause for this,

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investigation shows, is in most cases timidity arising from a lack of knowledge of what to do and how and when to do it.

To obviate this difficulty, in July of this year, a Women's Institute School for branch and district officers was put on at the Macdonald Institute, Guelph, running concurrently with the School for Rural Leadership, for one week, the students enjoying some of the same lectures and the social and recreational features of that side of the college life in addition to their own. The Institute School was in charge of the Superintendent and members of the provincial institute lecture staff, assisted by Miss Cruickshank of Macdonald Institute.

Although, owing to the shortness of time and limitations of accommodations, invitations to attend had to be confined to branches in the counties adjacent to Guelph, twenty-five registered for the week's course. Instruction was given by lecture, demonstration, and class discussion, the interest displayed being very keen.

The following outline gives some idea of the scope of the course:—

Historical Development of Agriculture and Country Life.

The Country Life Problem and the Answer.

The Family in Rural Life.

History of Women's Institutes: their Present Status and Relationship to Government Service.

Basis of Organization: Branch, District, Provincial.

Parliamentary Procedure, including Methods of Conducting Meetings, Elections, etc.

District and Branch Officers—Selection, Responsibilities and Opportunities.

Programme Planning in the Branch Institute.

The Girls in the Institute.

Responsibilities of the Home-maker.

Labour-Saving Methods in the Home.

Community Activities—

The School and Its Allies;

Play and Games in Relation to Community Well-being;

Community Halls and Libraries;

Community Singing.

Linking up the Institutes with the Services Available through the Various Departments of the Government: Agriculture, Public Health, Education, Labour.

MINISTER OF AGRICULTURE FOR SASKATCHEWAN

Mr. John Archibald Maharg has been appointed Minister of Agriculture in the Government of Saskatchewan, succeeding the Honourable Charles McGill Hamilton, resigned. Mr. Maharg, who is a director of the Saskatchewan Co-operative Elevator Company, was a

member of the House of Commons from 1917 until the present year when he resigned to accept the provincial portfolio.

Mr. Maharg, who is of Irish parentage, is a native of Dufferin county, Ontario.

PART III

School Agriculture and Related Activities

AGRICULTURAL EDUCATION IN CANADA

Address delivered at the Imperial Conference of Teachers' Associations
Toronto, August 10-13

BY J. B. REYNOLDS, M.A., PRESIDENT, ONTARIO AGRICULTURAL COLLEGE

AGRICULTURAL Education in Canada in the broadest phase of the term radiates in three directions from a common centre: there is vocational training for the business of farming, which phase will not be discussed as such in this paper; a second is education for agriculture and country life; a third is education through agriculture for a common citizenship.

The two purposes of education with which this paper will deal, namely, education for agriculture and country life, and education through agriculture, are accomplished, or attempted, by every grade of institution from the public school to the university. In most, if not in all of the Canadian provinces, some agricultural education is offered in the public schools under the provincial departments of education, and these include continuation schools and consolidated schools. In Nova Scotia, Quebec, Ontario, and Alberta, there are agricultural schools which combine the three purposes mentioned. Ontario and Manitoba has each an agricultural college, with its own staff of teachers and courses of study, while Quebec, Saskatchewan, Alberta, and British Columbia has each a faculty of agriculture within the university.

Agricultural Education in the Public Schools

A somewhat vague and unformed but persistent impression has prevailed in Canada that agriculture should be taught in the public schools. In the report of the Ontario Agricultural Commission published in 1881, the section on Agricultural Education has this to say:—

"It may be noticed, however, that both Mr. Mills¹ and Mr. Johnston² advocate the extension of our system of agricultural education beyond its present limits by introducing it into our public schools, and by establishing agricultural schools in the counties."

In a study entitled "Rural Schools in Canada" (1913), Dr. J. C. Miller reports:

"The one point at which each province professes to give some work of peculiar interest to rural children is in the courses in nature study and elementary agriculture, sometimes called 'Elementary sciences' or 'object lessons and familiar science' or 'useful knowledge.' The common judgment of the inspectors, taking the country as a whole, is that, with the exception of relatively few cases, this project is either ignored or

¹ President of the Ontario Agricultural College, 1879-1904.

² President of the Ontario Agricultural College, 1875-1879.

dealt with in an informal and haphazard way with quite unsatisfactory results. Nature study and elementary agriculture studied through books for the sake of passing examinations, are, however, gradually giving way before genuine efforts to make the work amount to something. Some provinces, particularly Manitoba, Ontario and Nova Scotia, are making a real effort to strengthen this course, in the rural schools especially. The greatest difficulty experienced by the provinces is to transfer the course of study, from paper into a reality in the experience of the teachers and children."

Two ideas relating to agriculture in the public schools seem to be struggling for recognition, and to be finding expression in the topics taught and in the methods of presentation. There is the idea that children born in the rural districts should be taught agriculture for vocational purposes in order that they may be the better fitted to follow farming as an occupation, and be less inclined to leave the country for the town. In the report of the Ontario Agricultural Commission already referred to, occurs this statement of opinion, which indicates that forty years ago in Ontario rural depopulation had already set in:

"Great indeed will be the advantage to Ontario if any means can be devised to correct the growing disposition of the rising population of our agricultural districts to forsake rural life for pursuits, already overcrowded, in towns and cities." Against the vocational purpose in rural education two strong protests have arisen: the one an educational protest, that elementary education should have no specific vocational purpose, but should prepare for the duties of a common citizenship. The other protest comes from the parents of rural children. They object to the assumption that because their children are born in the country, they must necessarily stay

there and be denied the opportunity of choice of occupation.

The second idea in agriculture for public schools is that since education is a preparation for life, local aspects of human industry, of human interests, and of social activities, may be effectively used by the teacher to illustrate and to enforce the lessons of the school. Useful knowledge is just as useful if gained by observation of the life in the school district as if gained from books about distant lands. Knowledge of geography, history, language, natural objects, natural phenomena, civics, industries, products, exports, imports, social laws, customs, and obligations, all may be taught by illustration and reference to local examples. Thus incidentally the intellectual and social interests, and the importance of agriculture and country life in the life of the nation and of the world may be revealed to the minds of rural children, just as similar interests and values in the town may be revealed to the minds of children there. This process of using local material for the education of rural children is an example of education through agriculture, and if applied understandingly, conserves the true purpose of education. At the same time this process is more likely to hold in the country those who by tastes and aptitude are fitted for farming and country life, than a formal attempt at vocational training could be.

The difficulties in the way of teaching agriculture in the public schools are mainly two: the lack of properly educated teachers and the inveterate habit of teaching from text-books and of following prescribed programmes to the neglect and exclusion of all local illustrative material.

Possible solutions for the education of teachers are, to introduce agriculture higher up, in the high schools and collegiate institutes, or else, to train teachers for rural schools at the agricultural college. Agriculture for high schools

will be dealt with separately. Teaching solely from text-books and according to a rigid programme is inveterate only with teachers lacking sympathy and vision. The teacher who has the "disciplined habit to see" the meaning and value of the busy life in the community about him

"Finds tongues in trees, books in the running brooks, sermons in stones and"—

good material for teaching in everything.

The essential factor of success in using the material offered by the garden, the farm, and the country side is the ability to find and interpret that material as illustration of the general principles laid down in text-books. A manual on school gardens, or on field crops, live stock, fruit-growing, weeds, insects, poultry, dairying, may be used as a general guide. But the point here is that to rely chiefly or altogether on text-books in teaching agriculture is to rob the subject of its distinctive character, and to reduce it to the level of the old-time scholastic subject. The distinctive character of agriculture as a subject of instruction in the public schools, and the justification for its introduction there, are that it deals with things rather than with books, and that it affords the opportunity to develop the powers of observation and judgment and the capacity to do things, rather than the faculties of imitation and repetition.

Space cannot be provided in this paper for statistics covering the teaching of agriculture in the public schools of Canada. Perhaps the extent of the work may be illustrated by some figures from Ontario, though doubtless Ontario has made more progress in this direction than most of the other provinces. Of 6,738 public and separate schools in Ontario, 1,648 schools taught agriculture in the year 1919-1920. The 1920 report of the Department of Education for Ontario quotes opinion from inspec-

tors, trustees, and teachers relating to the effect of this teaching. The general impression is that though the subject may be imperfectly taught it has had effects of undoubted value. It has quickened the interest of many pupils both in the general work of the school, and also in practical agriculture such as gardening, stock raising, and preparing farm products for exhibition. Skill in productive enterprises, a worthy pride in worthy accomplishments, the beginnings of scientific knowledge, and a new respect for agriculture both as an art and as a science are the results even of imperfect and somewhat haphazard attempts to teach agriculture in the public schools. When the teachers shall have a more thorough training in the principles of agriculture, and become better qualified to select and use the material at hand in every rural locality, agriculture will become a valuable adjunct to the scholastic subjects as an instrument of education of the young. "Education through agriculture".

Agriculture in the High Schools

In the report of the Ontario Department of Education already mentioned, Dr. Dandeno, Inspector of Elementary Agricultural Education, says:

"Notwithstanding the fact that excellent courses in agriculture—as far as can be given with the limited accommodation—are now being given in the Normal Schools, we can never hope to meet the needs of the Public Schools until the High Schools undertake the work as an essential part of the curriculum for teachers. This can be done only by providing for agriculture as a regular subject on the High School course of study."

The High School course of study is at present designed to meet two demands—that of a teacher's course and that of matriculation into the faculties of the universities—medicine, applied science, dentistry, or arts.

The Department of Education, in shaping the course for teachers, has thus far recognized agriculture only as an optional subject, while the university in prescribing courses that will admit students to its various faculties, has not recognized agriculture at all. This is true of the Ontario universities, and true of most, if not all, of the other provincial universities. In Ontario the agricultural college is not a faculty of the university but a separate institution, affiliated with the university for the purpose of conferring the degree in Agriculture. The Manitoba agricultural college stands in the same relation to the university there. Until 1919-20 in Manitoba, and until 1920-21 in Ontario, students had been admitted to the four-year course in the agricultural college without matriculation requirements. Matriculation is now required at both of these institutions. In Saskatchewan, Alberta, British Columbia and Quebec (Macdonald College) Agriculture is a faculty of the university. In Saskatchewan and British Columbia, Agriculture is an optional subject for matriculation. In Alberta, students may enter the degree course for Agriculture with ordinary matriculation, or from any of the six agricultural schools of the province.

A course in Agriculture covering four years of the high school period in Ontario is now being prepared (April 23, 1921). This course is the joint product of committees from the agricultural college and the Department of Education, and if approved by the university senate, will probably be an alternative subject for matriculation in Arts with elementary science in the Lower School, and experimental science in the Middle School. The course, as outlined, presents the following subjects:

Bacteriology.—In relation to foods, water, and infectious diseases.

Botany.—A functional study of root, stem leaf and flower. The economic

grasses: cereals, timothy, orchard grass. Fungi, and fungous diseases, such as oat smut, wheat rust, and black knot. Trees, identification, and study of common species.

Gardening.—Hot-beds and cold frames; growing early vegetables and small fruits; school gardens; planting bulbs.

Entomology.—Elementary and economic.

Dairying.—Milk testing; lactometer; food value of milk; use of milk separator.

Poultry.—Types and breeds, hatching and rearing chicks; poultry houses and poultry management, care of eggs; candling eggs.

Beekeeping.—Life history and work of bees; colony studies; swarming; construction of hives.

Chemistry.—Elementary; soil properties; chemical compounds; manures and fertilizers; insecticides and fungicides.

Physics.—Hydrostatics; drainage; farm mechanics; electricity for heating, lighting and power.

Farm Animals.—Types and breeds; comparisons of grade stock with pure bred.

Field Crops.—Types of farming; crop rotation; seed testing and seed-judging.

Surveys.—As time allows, district surveys of farm animals, crops, soil, types, etc.

This course, if accepted for matriculation in Arts (and also in Agriculture) will effect important results in the work of the high schools. It will be accepted also by the department of education in the course for teachers. It may be said that the Department of Education may accept it, and require it, even if it does not become part of the matriculation requirements. But the high schools will

not likely put in this course for teachers if an alternative is offered, and that alternative is required for the matriculation course. For the main work of the high schools of Canada is to prepare teachers for the public schools, and to prepare matriculants for the university. The alternative to agriculture being science as at present taught in the high schools, if agriculture will serve both for the teachers' course and for matriculation in arts, a number of high schools will doubtless teach agriculture to the inclusion of the alternative science course.

Teachers for rural schools will thus have the benefit of a course in agriculture, which in a more elementary form they will be prepared to teach in the rural schools. That will be one result, and another is equally important. Of all the boys and girls who enter the high schools of Canada only a small proportion remain long enough to secure matriculation or the certificate of teacher. For that large proportion who do not finish their high school course, some "educational agriculture" in that course will reveal to them the meaning, the value, and the interest in country life and country industries and occupations. I do not consider that instruction in agriculture, whatever form that instruction may take, is worth the time spent upon it if that instruction leaves the pupils cold or hostile toward country life; toward the interest and variety in the business of farming, and the

pleasures of working with growing things. A lively sense of rural values, of rural interests and rural opportunities are the results which should really be sought in teaching agriculture to the young. "Educational agriculture" is not merely learning how to handle a hoe or prepare a garden plot or feed a calf; nor is it merely nature-study; still less is it applied science; it may be all of these, but it is something more. It should develop tastes and appreciation of rural life and rural things, of the results of industry intelligently applied, of the beauty and the wonder and the power in the life of plants and animals, of rural sights and sounds and all the charm of nature. "Educational agriculture" is thus more than a body of knowledge, and more than manual skill. It is a point of view, a sense of values, which will lead boys and girls back from that path to the city where for most of them neither happiness nor usefulness can be found, back towards the open country which needs only a sufficient number of rightly-trained people to make it a more desirable place of residence than the town, toward which our educational and social ideals have too long been directing Canadian youth.

If we can find teachers who can be made to believe this, either for the high schools or the public schools, the problem of agricultural education for the schools will be solved, and it will not be solved without such teachers.

[To be continued.]

INTER-TOWNSHIP STOCK JUDGING COMPETITION

WELLINGTON county, Ontario, has taken a forward step in the training of young men for the judging of live stock by the holding of an Inter-township Judging Competition. The competition was held at the Ontario Agricultural College on June 10, having been organized by the Agricultural Representative, with the hearty

support of the county and township councils, and the farmers' clubs.

Seven townships entered teams, each consisting of five men under twenty-five years of age. The classes judged consisted of two classes of each of the following: heavy horses, beef cattle, dairy cattle, sheep, and swine. The men composing the teams had been

carefully trained by local live stock breeders selected by the township councils. In the training, the men were taken from farm to farm for three to four months previous to the contest, where actual judging was carried on under the direction of their respective trainers. The Wellington county council provided the prizes, which consisted of a \$50 silver cup, five silver shields, five silver medals, five bronze medals.

The contest consisted of placing the animals according to merit and the giving of reasons orally for the decisions made. The contest was in charge of Mr. R. H. Clemens, agricul-

tural representative, assisted by Professor Wade Toole of the Agricultural College and Mr. W. D. Jackson, Assistant Director of the Agricultural Representative Branch of the Department of Agriculture at Toronto. The keenest interest was shown, upwards of six hundred residents of the townships represented, including the parents and friends of the competitors, being present at the college to witness the contest. The judges were all practical farmers and stock breeders from points outside of the county. The silver cup was won by the Puslinch township team with a total of 3,694 points out of a possible 5,000.

DEMONSTRATION TEAM COMPETITION

About 250 demonstration teams representing Boys' and Girls' Clubs in the province of Manitoba, are carrying on local competitions to ascertain which of them shall meet in the provincial competition to take place at the Garden Show to be held in Winnipeg this autumn. The competitions for the Girls' Clubs include, among other things, canning, cooking, millinery, and the growing of potatoes. The provincial contestants will be subject to the following rules:—

1. Each team is to consist of three members, a captain and two assistants.

2. Each competing team will put on one 45- to 60-minute demonstration.

3. Demonstrations may include such subjects as the following: Canning, garment, dyeing, baking, sewing, home decorating, textiles, vegetable judging, milk testing and laundering.

4. Each team is expected to wear a distinct uniform for the occasion.

5. Each member of the canning teams will be required to forward twelve jars for exhibition at the Garden Show.

UNIVERSITY WEEK FOR FARM YOUNG PEOPLE IN ALBERTA

BY ALBERT E. OTTEWELL, DIRECTOR, DEPARTMENT OF EXTENSION, UNIVERSITY OF ALBERTA

DURING the week June 8-14 inclusive, there was held at the University of Alberta, Edmonton, the third annual University Week for Farm Young People. Altogether one hundred and sixty-four young

people were in attendance, eighty-seven boys and seventy-seven girls. These were from the farms in all parts of Alberta, seventy communities being represented. An age limit of sixteen to twenty-five was imposed.

The conference, the third of its kind in Alberta, was a co-operative undertaking in which the United Farmers of Alberta and the United Farm Women of Alberta promoted the attendance, drawn almost entirely from the branches of their organizations, and more especially from the Junior Locals. The University of Alberta, through the Department of Extension and the College of Agriculture, undertook to provide the programme, and residence accommodation was provided in the residences of the university. A wide variety of material was presented in the programme, ranging from practical agriculture in field husbandry, animal husbandry, poultry, dairying, and the history of agriculture, to physical education for both boys and girls, amateur dramatics, history and citizenship. Two special features were a grand field day for athletic competitions and a concert, where the major part of the programme was furnished by the young people

themselves, who had been trained during the week. Both the Y.W.C.A. and the Y.M.C.A. helped greatly with the undertaking by lending the services of the provincial field secretaries for boys' and girls' work.

The residence arrangements were on the group plan and a keen competition ran through the week in which points were awarded groups for almost every side of their work, from the neatness of rooms which both boys and girls cared for themselves, to punctuality at meals and lectures. It is intended that the group numbers will be perpetuated for successive years and a tradition established to maintain or improve their respective records.

The activities of the week concluded with a banquet at which toasts were proposed and responded to by the young people, and a social evening featured by the introduction of folk dances and games suitable for community gatherings.

HOME-MAKING COURSE FOR GIRLS IN NEW BRUNSWICK

THE Superintendent of Women's Institutes for the province of New Brunswick, Miss Helen J. Macdougall, reports that a short course for girls in home-making was held at the Agricultural College, Truro, July 12 to 22, 1921. Twenty-two students registered and the course was an outstanding success in every way. The subjects taught included cookery, food values, table setting and serving, canning fruits and vegetables, dressmaking and basketry. Demonstrations and talks on the menu under consideration were held at the beginning of each session. The class then divided, one half of them preparing the meal and the other half taking instruction in dressmaking. The next session the class were reversed and

those who had been cooking, formed the dressmaking class.

Every effort was made to make the course as practical and attractive as possible. Instruction in the manipulation and cookery of the staple food stuffs and the planning and preparing of simple meals was the work of the cookery class. In addition, the girls made all the bread which was used during the course, with the exception of the first day, as well as all other bread stuffs, such as biscuits, rolls, cakes, cookies, etc.

We were fortunate in being able to rent a large house where the out-of-town students were in residence during the course. These girls had the opportunity of preparing and serving their own breakfasts and also had the care of the

house and their rooms. The evenings were devoted to basketry.

Tuition was free, but the girls paid for the materials used in preparing their meals, and for the rent of the house. This came to considerably less than regular board, so that the expense of the course was reduced to a minimum.

The closing day of the course, an exhibit of the work in dressmaking, basketry and canning was held. The pub-

lic was invited and large numbers attended. They found it difficult to believe that in the short space of time, such a splendid exhibit of work could have been prepared by young girls. The quality of the work was excellent, and the display was most attractive. Miss Elizabeth Ellis and Miss Eleanor Sugatt of Truro, and Miss Mary Dee of Halifax, Instructor in Dressmaking, assisted Miss Macdougall.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes

NEWS ITEMS AND NOTES

The Department of Agriculture of the province of Quebec recently made several additions to its staff of district agronomists. The province now has 49 agronomists and 19 assistants.

A convention of district supervisors of the Manitoba division of the Soldier Settlement Board held a two-day conference at Winnipeg. The purpose of the conference was to arrive by discussion at the best means of carrying forward the work of assisting soldier settlers to improve their land and becoming successful farmers.

Mr. Wm. B. Varley, Assistant to the Commissioner under the Agricultural Instruction Act (Dr. J. H. Grisdale acting), visited the Western Provinces during the month of July in the interest of the work. Mr. Varley also represented The Agricultural Gazette, with which he has been connected for some months as Acting Editor.

An official statement issued by the Bureau of Crop Estimates of the United States Department of Agriculture, places the Marquis variety of wheat in the leading position in the spring wheat belt, which includes Minnesota, North and South Dakota and Montana. The report states that Marquis was least important in 1914, but in 1916 it had jumped into first place and has held this position since.

The Canadian Wheat Board, which was responsible for the handling of the 1919 wheat crop of Canada, did business to the extent of about ten million dollars. According to the statement of the chairman of the Board, Mr. James Stewart, the cost of administering the Board, including general expenses, auditing, registration of participa-

tion certificates, payment of participation certificates, collection of assessments, statistical, and all other branches, will have cost less than one-half cent per bushel of the grain handled by the Board.

For the purpose of extending the market in Great Britain for Canadian wools, Mr. G. E. O'Brien, general manager of the Canadian Co-operative Wool Growers, Limited, took to England samples of all classes and grades of Canadian wool to be placed before the English wool trade. A further purpose of Mr. O'Brien's visit was to select a suitable firm of wool brokers to act as selling agents for Canadian wools on the Bradford wool market.

The Canadian Ayrshire Breeders' Association have employed a fieldman in the person of Mr. J. T. Clement. Mr. Clement, who spent five years in Record of Performance work with the Department of Agriculture, Ottawa, will spend his time in the advancement of the Ayrshire breed throughout Canada.

The export of foxes from Canada to the United States last year was 805, as compared with 335 the previous year.

The Ontario Government has established a cold storage warehouse for apples at the town of Brighton. This warehouse is established as an experimental and demonstration enterprise. The building will be fitted with refrigeration machinery. The primary purpose of the building is the pre-cooling of summer and fall apples. It is expected it will be available also for the storage of the later crop grown by orchardists in the neighbourhood.

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The Board of Directors of the Royal Agricultural Winter Fair have decided to adopt a new policy with respect to the distribution of prize money at their first show to be held at Toronto at the end of November this year. Instead of graduating the prizes, as is the custom at fairs generally, equal prizes will be given in each section. That is to say, all winners will receive an equal share of the prizes set apart for that section. Competitors, however, will be placed in the order of merit and receive corresponding distinctive ribbons or cards.

Co-operative shippers of Grey County, Ontario, have adopted a system of making returns that has simplified their transactions. Seven clubs send out each week from one to three carloads of stock through a local shipper. The returns on each transaction are divided between the individual owners of the stock by the U.F.O. agency at the Toronto stock yards, and the whole is paid into the bank in Grey County, which issues cheques to the individual owners. These clubs charge each farmer shipping the stock five cents per head on sheep and hogs and 10 cents per head on cattle, to provide a reserve fund and insure against loss.

The Manitoba Department of Agriculture held conferences of the municipal weed inspectors at Winnipeg, Brandon, Minnedosa, Dauphin and other points, in the months of May and June. The Winnipeg meeting was attended by the Commissioner of Agriculture for Minnesota and the Weed Inspector for that State, which led to consideration being given to the adoption of uniform methods for weed control on both sides of the international boundary, where weed problems are naturally similar.

A Boys' Live Stock Judging Competition was held at Brandon Fair this year for the first time. The training of the several team that competed was largely the work of the agricultural representatives stationed throughout the province. All classes of live stock were judged.

Upwards of four carloads of grade Holstein and Ayrshire heifers and cows, ordered by farmers in Saskatchewan, are being supplied through the Live Stock Branch of the Provincial Department with stock purchased in Ontario and Quebec.

The Saskatchewan Department of Agriculture held a series of forty-three meetings throughout the province, chiefly for the purpose of acquainting the farmers of the province with the methods and advantages of marketing live stock on the co-operative plan.

Four members of the staff of the Ontario Agricultural College have entered upon courses of study in agricultural colleges in the United States with the view of obtaining the degree of Master of Scientific Agriculture. Mr. J. Coke, lecturer in Farm Economics, is pursuing his studies at the College of Agriculture of the University of Wisconsin. Mr. D. R. Sands, lecturer in Botany, and Mr. E. S. Snider, an official of the Poultry department, are also taking special work in their chosen branches at this institution. Mr. J. P. Sackville, Assistant Professor of Animal Husbandry, is specializing in Dairy husbandry at the Agricultural College at Ames, Iowa, and Mr. E. W. Kendall, lecturer in Manual Training, is improving his knowledge of farm mechanics in Detroit, which is the centre of the motor industry.

Mr. W. R. Graham, Professor of Poultry Husbandry at the Ontario Agricultural College, was one of the instructors at the Fourth Annual Poultry Judging and Breeding School held at the New York State College of Agriculture from July 4 to 9. Professor Graham gave instruction and demonstrations on the score card in judging for egg production, judging meat type by the score card and comparison. Professor Graham also assisted in conducting a judging contest between students, and acted upon a committee appointed to work out a standardization of methods of judging fowls for egg production.

ONTARIO PLOUGHING MATCH AND MACHINERY DEMONSTRATION

The Ontario Plowmen's Association will this year hold its International Ploughing Match, Tractor and Farm Machinery Demonstration from October 19 to 21 at the city of Woodstock. The demonstration, which is held at a different point each year, is directed by Mr. J. Lockie Wilson, of the Ontario Department of Agriculture, Toronto. The attendance at this gathering usually averages from 40,000 to 50,000, and the benefit to the younger farmers of the province, states Mr. Wilson, is most pronounced. All classes of implements and power machines will be in operation, and the ploughing contest is open to the farmers of the United States and Canada.

CO-OPERATIVE SHEEP DIPPING

The co-operative principle is being applied to the dipping of sheep in Brant county, Ontario. Following a dipping demonstration given last season in that county by the Dominion Live Stock Branch, the Brant Sheep Breeders' Club purchased a complete portable dipping outfit. This was used in dipping some sixty flocks, comprising twenty-four hundred head, in the month of June

this year. The flocks were brought to nine central points, where the dipping was done at a cost of four cents a head. It is the intention of the club to continue dipping twice annually, in the months of June and October.

SASKATCHEWAN AGRICULTURAL CONFERENCE

The second annual agricultural conference conducted by the Department of Agriculture of Saskatchewan was held at Estevan before the end of June. The main object of the conference was the bringing closer together of the farmers of the province and the college of agriculture, to study agricultural problems. The conference was called and directed by the Deputy Minister of the Department.

The principal speakers were: Mr. F. H. Auld, Deputy Minister of Agriculture; Hon. J. A. Maharg, Minister of Agriculture; W. J. Rutherford, Dean of the provincial College of Agriculture; Mr. G. H. Hutton, head of the agricultural and animal industry department, Canadian Pacific Railway; Mr. John Bracken, Principal of the Manitoba Agricultural College; Professor M. Champlin, Professor of Field Husbandry of the University of Saskatchewan; Professor Harrington, also of the College of Agriculture; Mr. J. F. Booth, Director of the Co-operative Organizations and Markets Commissioner, and others.

The programme consisted of addresses and discussion upon such important topics as diversified farming of a permanent character; meadows and pasture crops; soil drifting and its control; the summer fallow and suggested substitutes; silo construction and the growing of crops for ensiling; co-operative marketing.

DAIRY COMPETITIONS FOR SASKATCHEWAN

The Department of Agriculture of Saskatchewan, in co-operation with the Saskatchewan Dairy Association, is carrying on three principal competitions this year with a view to encouraging the owners of dairy herds to give greater attention to the production of their cows. The contests include the Greater Average Production Competition, the Record of Performance Competition, and the Keeping of Records of Milk and Butter-fat Production. The Greater Average Production Contest, which has been carried on for the last three years, was described in the May-June Gazette on page 330. The Record of Performance and the Production Record contests are new this season. In the Record of Performance competition two silver cups have been provided. One is available to the owner of the Ayrshire cow or heifer showing the highest standing for her respective age

or class, and the other to the owner of the Holstein cow or heifer judged on a similar basis.

SASKATCHEWAN TO EXHIBIT LIVE STOCK AT CHICAGO AND TORONTO

The Saskatchewan Live Stock Board, in co-operation with the provincial Department of Agriculture, has made provision for sending live stock exhibits to the Chicago International and the Toronto Royal shows this year. Live stock owners in the province are invited to participate in this display, which is likely to include Clydesdale, Percheron, and Belgian horses, beef cattle of various breeds, Oxford, Shropshire and Suffolk sheep, and Yorkshire and Berkshire swine.

As an inducement to the breeders to make thorough preparation for these displays, the Saskatchewan Department of Agriculture is awarding to each exhibitor who wins a grand championship prize, \$500; for reserve championship, \$300; either senior or junior championship, \$200; and reserve senior or junior championship or first prize in either open classes or breed specials, \$100. Not more than one of these prizes, however, can be won for the same animal.

The department will provide free transportation for the stock, which will be assembled at Regina at the time of the sheep and swine show in November, and shipped from there direct to Chicago, from Chicago to Toronto, and then back to Regina.

TESTING MILK AND CREAM

New regulations respecting the testing of milk and cream at creameries in the province of Nova Scotia came into effect on the first of June this year. Regulations have been authorized by Order in Council to the following effect:—

1. Every creamery purchasing or handling milk or cream and testing the samples daily shall keep or cause to be kept until noon the day following the day on which the tests are made a sufficient amount of the original unchanged sample of such milk or cream as is required for the purpose of retest.

2. Composite samples of milk or cream shall be kept from the time the test was made unadulterated, closely stoppered and in a cool place for a period of fifteen days from and not including the day on which such composite samples were tested.

3. Any Dairy Inspector, appointed under the Act, shall have the right to take samples of cream for testing out of any patron's can either at the farm, while being transported to the creamery, or while at or in the creamery or any time previous to the cream being mixed with other cream.

4. Any Dairy Inspector, appointed under the Act, shall have the right to examine and retest all samples and composite samples as mentioned in regulations 1 and 2, and shall

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have access to same at all reasonable hours and may by written consent release the holding of samples as mentioned in regulation 2 at any time before the fifteen days have expired.

5. Any "patron" may demand and get delivery of the composite sample of his milk or cream delivered or sent by him, providing a previous order has not been given by the Dairy Inspector to have same destroyed.

6. Every creamery shall provide at least two composite sample bottles for each "patron."

BEE-KEEPING DEMONSTRATIONS IN MANITOBA

The Department of Agriculture of the province of Manitoba held bee-keeping demonstrations at a number of points in the month of July. The demonstrations were in charge of Mr. L. T. Floyd, the newly-appointed Provincial Apiarist, and took place at the homes of the bee-keepers who operate their plants in modern fashion. In addition to the demonstration of seasonable activities the question of wintering was thoroughly covered in some instances. At the meeting held in the apiary at Dominion City, it was stated that among the strongest colonies were those wintered outside in packing cases. The success of bee-keeping in Manitoba was shown by a bee-keeper at St. Jean, who reported that from a stray swarm he claimed six years ago he had now 76 colonies, and last year sold more than two tons of honey. The handling of "out apiaries" was demonstrated at the home of the President of the Manitoba Bee-keepers Association, Mr. G. M. Newton, who operates about three hundred colonies. A feature of the meetings was the opening of the hives and handling of the bees without veils.

COMMUNITY CENTRE MOVEMENT IN BRITISH COLUMBIA

At several rural points in the province of British Columbia action has been taken to provide suitable meeting places for social and business occasions. At Sardis, after a canvassing campaign on the part of a number of public-spirited citizens, it was decided to form a joint stock company of limited liability to build and manage a community hall. The organization is known as the Sardis Community Hall Company, Limited. The stock shares are valued at \$10.25 each. Having raised \$4,000 on the sale of shares, a hall 36 by 94 feet was erected. This includes a main hall 35 by 60 feet with a raised stage and dressing rooms; also a kitchen and two cloak rooms. The building adjoins the public playgrounds, where games can be witnessed from a balcony of the hall. A movement is under way at Fairfield Island and Cortez Island for the providing of similar

halls. At the former point, locals of the United Farmers have voted in favour of a community building. At Cortez Island the Farmers' Institute is behind the movement and has gone so far as to undertake the construction of a building.

MACDONALD COLLEGE—NOTES

Mr. M. A. Jull, M.Sc., Manager and Lecturer in Poultry Department, has just returned to the College after spending nine months (one college year) in the Department of Genetics, at the University of Wisconsin, Madison, Wis., in postgraduate studies leading to the Ph.D. degree.

Miss M. E. Kennedy, B.A., Assistant in Bacteriology, had the degree of M.Sc. conferred upon her by McGill University, following postgraduate studies undertaken in Bacteriology at Macdonald College.

Mr. E. M. Du Porte, B.S.A., M.Sc., Lecturer in Entomology and Zoology, has received the degree of Ph.D. from McGill University, following postgraduate studies in Invertebrate Morphology and in Parasitology.

Mr. L. G. Saunders, B.S.A., Halifax, N.S., has received the degree of M.Sc. from McGill University after postgraduate studies in Entomology.

Mr. Saunders was also nominated by McGill University for the Science Scholarship granted by Her Majesty's Commissioners for the Exhibition of 1851. These scholarships, of the value of £200 sterling a year, are tenable for two or, in rare instances, three years. They are limited, according to the Report of the Commission, "to those branches of science such as physics, mechanics and chemistry, the extension of which is specially important for our national industries." Their object is not to facilitate ordinary college studies, but "to enable students to continue the prosecution of science with the view of aiding in its advance or in its application to the industries of the country. It is open to students of not less than three years' standing, who have shown evidence of capacity for original research, and is tenable at any university or other institution approved by the Commission."

Mr. J. B. McCarthy, B.A., M.Sc., Assistant Professor of Chemistry, completed the requirements for the degree of Doctor of Science, which was conferred upon him in absentia at the Convocation of the University of King's College, Windsor, N.S.

Twelve demonstration flocks of chickens were operated in Quebec by the Poultry division of Macdonald College in 1920. These served as partial sources of hatching eggs for school fair work and as community breeding centres for the distribution of pure stock. Demonstrations and lectures were given at farmers' meetings on the culling of

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laying and breeding flocks, egg-marketing, and the preparation of poultry for market.

The Pomological and Fruit Growing Society of the province of Quebec has established a packing house for apples at the town of Chateauguay for the use of local growers.

PRINCE EDWARD ISLAND NOTES

Owing to the dissolving of the Brick and Tile company, the Department found it necessary to take over the operation of the company's plant near Richmond. A sufficient quantity of tile will be manufactured to maintain the operations of the ditcher throughout the season, as well as other demands.

The limestone quarry has been re-opened, and a new engine installed. Many enquiries are being received for delivery of pulverized limestone later in the season. The encouragement for the more general use of such material will come with several tests, which are being given in different parts of the province.

The growing of clover for seed has received a set-back with the dry condition of this season and has suffered as well from several late frosts, which visited the province during the latter part of May. The western part of the province has been carefully surveyed with a view to operating the clover huller during the latter part of the season, and prospects are only average at the present time.

The competition for the promotion of dairying, which was instituted for the first time in 1920 and which received favourable consideration from the milk producers, has again started for this season. The work is under the charge of a dairy instructor and is receiving a more favourable consideration than formerly. The dairy instructor spent the early part of the season in visiting the factories and reports favourably on an increased production over former years.

Approximately one hundred and seventy-five schools will participate in school fairs this season. A number of clubs have had

day-old chicks distributed to them at cost. Pig clubs have purchased pigs on a note payment.

THIRD INTERNATIONAL GRAIN AND HAY SHOW

The Third International Grain and Hay Show, which is held in conjunction with the International Live Stock Show, will take place on November 26 to December 3, at the Union Stock Yards in Chicago. The classification includes corn, oats, barley, wheat, soy beans, cow peas, field peas, rye, kaffir and milo corn, and small seeds. For the purposes of this show the United States and Canada have been divided into six regions from which entries may be made. Canada is represented in Regions 1 and 2. Region No. 1 includes all of the Dominion except the south-western portion of Ontario bounded on the north by a line drawn straight west from Toronto to Lake Huron. This region also includes the states of Washington, Oregon, Montana, Idaho, Wyoming, and North Dakota and the western half of South Dakota and Nebraska, the northern two-thirds of Minnesota, northern half of Michigan and Wisconsin, all of Maine, New Hampshire, Vermont, and Massachusetts, northern half of New York. Region No. 2, including the south-western counties of Ontario, takes in South Dakota, the southern third of Minnesota, southern halves of Michigan, Wisconsin, and New York; also Connecticut and Rhode Island.

The competitions provided in which Canada may take part are as follows: Corn, ten ears, single ear; Flint corn, ten ears; wheat, oats, rye and barley, each one peck; hay, one bale of not less than 50 lbs.; kaffir and milo, 10 heads; small seeds, including red clover, alsike clover, sweet clover, alfalfa and timothy, each four quarts; cow peas and field peas, one peck; and ten ears of corn of any variety open to members of corn clubs.

Towards premiums for this show the Chicago Board of Trade offers \$10,000.

Full particulars may be obtained by applying to the Superintendent, International Live Stock Exposition, Grain and Hay Show Department, Union Stock Yards, Chicago, Ill.

APPOINTMENTS AND STAFF CHANGES

Mr. F. C. Nunnick has been appointed Chief of the Division of Extension and Publicity, Experimental Farms Branch. Mr. Nunnick, who was connected with the Commission of Conservation as Agricultural Adviser from December, 1910, until the time it disbanded, gained his knowledge of farming on his father's farm in Brant county, Ontario, which he managed for over six years. After graduating from the Ontario Agricultural College in 1910, he served for a time on the staff of agricultural representatives of the Ontario department. While on the staff of the Conservation Commission he directed the agricultural surveys made by that body, which were the first of the kind undertaken in Canada. He also supervised the work in connection with the 35 illustration farms started by the Commission in 1912, and taken over by the Dominion in 1914, as well as the "Illustration County" undertaking. Mr. Nunnick will have charge of the exhibition work and the general supervision of the Extension and Publicity work of the Experimental Farms System.

Mr. H. R. McLarty, M.A., of Ridgetown, Ontario, has been appointed to the position of Plant-Pathologist-in-charge of the field of laboratory about to be established at Summerland, B.C., by the Division of Botany of the Experimental Farms Branch.

Messrs. J. T. Hockey and P. M. Simmonds, recently graduated from Macdonald College, have been appointed as Assistant Plant Pathologists at the Division of Botany's Branch laboratories at St Catharines and Saskatoon respectively.

W. R. Leslie, a graduate of Manitoba Agricultural College, has been appointed superintendent of the Dominion Experimental Farm at Morden. He has until now been in charge of the Ontario Provincial Government station at Fort William. Morden is an important point, as very extensive work in horticultural research is being carried on there.

Mr. Leslie will replace E. M. Straight, who has been in charge of the Morden farm since its inception. Mr. Straight becomes superintendent of the Dominion farm at Sydney, Vancouver, B.C., in place of Lionel Stevenson, who has resigned to accept a position in the Ontario Department of Agriculture.

Lionel Stevenson, B.S.A., has been appointed Secretary and Supervising Director of the Ontario Department of Agriculture. This position combines the former position of Secretary, which has been vacant for some time, and new duties to bring about a greater co-ordination and co-operation in the work of all branches of the Department. It will be the duty of this officer to assist men in all branches in planning and carrying out work, to keep in touch with all the activities in the field, and be a connecting link between the different branches both in strengthening present work and developing new lines.

Mr. Stevenson has had training and experience which admirably fit him for the duties he will be expected to discharge. He is a son of Mr. R. S. Stevenson, of Ancaster, one of the best known farmers and live stock men in the province. He graduated from the Ontario Agricultural College in 1912 and immediately took a position as Professor of Agriculture at the Agricultural College at Truro. After filling this position for a year he went to the University of Illinois and took his M.S. degree. Afterwards he was appointed Superintendent of the Dominion Experiment Station at Sidney, B.C., and he has held this position up to the present time.

Mr. S. R. N. Hodgins, B.S.A., has been appointed to the staff of Macdonald College as Instructor in Journalism.

Mr. W. H. Howitt, B.S.A., joined the Macdonald College staff, on February 1, as Lecturer in Horticulture. He is a graduate of the Ontario Agricultural College, has had experience in the extension service of the Horticultural Branch of the British Columbia Provincial Department of Agriculture and at the Ontario Agricultural College.

Mr. J. R. Almey, B.S.A., has been added to the staff of the Agricultural Extension Service of the Manitoba Department of Agriculture. Mr. Almey will for a time devote his time to general horticultural work, more particularly in relation to potato and vegetable growing, co-operative marketing, standardizing of varieties and other problems of the gardener.

The British Columbia Department of Agriculture announces the appointment, as district poultry inspectors for the lower

mainland and southern interior of the province, of Mr. W. W. Traves, a graduate in agriculture from the University of British Columbia, and Mr. Charles Good, a recognized poultry judge who has occupied important positions on large poultry producing farms.

Mr. R. C. Treherne, who for some time past has occupied the position of Entomo-

logist for British Columbia, representing the Dominion Entomological Branch, has been appointed chief of the division of Field Crops and Garden Insects at Ottawa. While in British Columbia, Mr. Treherne built up an excellent organization and, with the co-operation of the provincial department, established field laboratories at different points in the province. He will take up his new duties in October.

ASSOCIATIONS AND SOCIETIES

THE CANADIAN SOCIETY OF TECHNICAL AGRICULTURISTS.

The Canadian Society of Technical Agriculturists held its first annual convention at Winnipeg the end of June, with a registered attendance of seventy-one. Mr. L. S. Klinck, President of the University of British Columbia, and president of the Society, expressed the feeling of the executive that the time has arrived for an energetic prosecution of the aims and objects of the organization. He extended an invitation to all technical agriculturists to take an active part in the determining of the Society's policies and in the giving of the fullest effect to them. He set down three issues requiring urgent attention, namely, (1) Agricultural education, in the broadest acceptance of that term; (2) Agricultural policies—Dominion, Provincial, and College, and (3) Organization of technical agriculturists from the standpoint of the individual as well as that of the profession.

Mr. F. H. Grindley, General Secretary of the Society, reported a membership of 557, distributed in the nine provinces, with 11 in the United States and 3 in foreign countries. Thirteen local branches have been formed, including at least one in each province.

An amendment made to the constitution and by-laws, relating to membership, provides for three classes, regular, associate and honorary.

1. A regular member must be (a) A graduate in agriculture from a university or college of recognized standing; (b) A graduate of a university or college who is engaged primarily in agricultural research, administration, education, extension work, publicity, experimental problems, or other forms of allied work of a scientific or managerial nature; or (c) a non-graduate who is engaged primarily in agricultural research, administration, education, extension work, publicity or experimental problems and be accepted as provided for in the by-laws.

2. Associate membership shall be open to those engaged primarily in agricultural research, administration, education, extension work, publicity or experimental problems, who are not at the time eligible for regular membership, and to the undergraduates of agricultural colleges. Members of this class must be accepted by the Dominion Executive. They shall have no voting powers.

It was decided to continue the annual membership fee at \$10.

The Publications Committee arranged for in the original constitution is to be discontinued, and an editorial board substituted.

In addition to the regular business of the convention the programme included reports of the committee on research, and on marketing education.

The next annual convention is to be held in Montreal.

The following officers were previously elected by mailed ballot:—President, L. S. Klinck, President of the University of British Columbia; First Vice-President, H. Barton, Professor of Animal Husbandry, Macdonald College; Second Vice-President, John Bracken, President Manitoba Agricultural College; General Secretary-Treasurer Fred H. Grindley, Gardenvale, Que.

THE CANADIAN SEED GROWERS' ASSOCIATION

The Canadian Seed Growers' Association, which has been in operation since 1904, was on June 20, 1920, incorporated under the Companies Act as a recognized business unit. The members of the company are:—Dr. James W. Robertson, Ottawa; Dr. C. A. Zavitz, O.A.C., Guelph; Professor T. J. Harrison, Manitoba Agricultural College, Winnipeg; Mr. Narcisse Savoie, Secretary, Department of Agriculture, Quebec, and Professor Robert Summerby, Macdonald College.

The company in its new form will continue the work of advancing the interests of seed growers and other farmers by:

(1) Making regulations respecting the growing, selecting and preserving of seed of various kinds of farm crops for the guidance of its members;

(2) Causing records to be kept of the history of seeds produced by members;

(3) Fixing standards for seeds that may be eligible for registration;

(4) Publishing information as to standards;

(5) Issuing certificates of registration to members by which hand-selected seed or the product thereof may be distinguished from other seed;

(6) Such other means as may be expedient from time to time.

The operations of the corporation are to be carried on without share capital throughout the Dominion of Canada and elsewhere by the name of "The Canadian Seed Growers' Association," and the chief office of the said corporation is to be at the City of Ottawa. The secretary is Mr. L. H. Newman, Ottawa.

FEDERATED WOMEN'S INSTITUTES

The second biennial convention of the Federated Women's Institutes of Canada met at the University of Alberta, Edmonton, June 20 to 25. The provinces were nearly all represented, there being two delegates from each. Reports of the conveners of the several committees constituted an important part of the programme. Mrs. Laura Rose Stephen in reporting for the Agricultural Committee urged that the aim of women's institutes should be to make attractive rural occupations and social life. Mrs. W. W. Baird, convener of the committee on Household Economics, contended that amongst the greatest drawbacks to life in the country are the lack of conveniences in the home, bad roads, lack of social and community life, and isolation. Resolutions asking for greater progress in road improvement followed Mrs. Baird's report.

The report on Education and Better Schools prepared by Mr. George A. Putman, Superintendent of Institutes for Ontario, contained a brief summary of the progress that had been made in education in the various provinces. In Alberta, educational loans are available to assist students in financing their normal courses, teachers' residences in rural districts are provided; child welfare stations have been established; physical culture is taught; school gardens are encouraged, and free seeds given for home gardens; and school fairs are held. Sixty consolidated schools in the province had increased the attendance one hundred per cent in some cases. In Saskatchewan similar undertakings are carried on; a play and playground equipment bulletin is issued; Boys' and Girls'

Clubs were directed by the Department of Education. In Ontario the new outstanding moves have been in the direction of encouraging higher salaries for teachers, the providing of medical and dental inspection of schools, and hot lunch coupled with instruction in domestic science. Quebec was reported as making progress in the teaching of French in the English schools and English in the French schools. In New Brunswick medical inspection is in practice, and a general improvement in the school conditions was reported. In Nova Scotia the system of travelling teachers was referred to, as well as the work accomplished by women's institutes in beautifying the school grounds, introducing the hot lunch idea and the supervising of school playgrounds.

Mrs. Alfred Watt, convener of the Committee on Institute Technique, reported that women's institute schools were being held in three provinces—Manitoba, Ontario, and Alberta.

It was decided to do away with the standing committee on national publicity and to entrust the work to the publicity secretary. Provincial conveners will be responsible for provincial news.

Resolutions passed recommended the inauguration of a women's division of the Federal Department of Agriculture; that the expenditure of funds be confined to institute organization and to the furtherance of aims and objects as specified in the constitutions, and that institutes should guard against degenerating into money-making institutions; that the Federated Women's Institutes should co-operate with other countries to organize the international federation throughout the world.

The following officers were elected for 1921-1923:—President, Mrs. W. Todd, Orillia, Ont.; First Vice-President, Mrs. Arthur Murphy, Edmonton, Alta.; Second Vice-President, Mrs. David Watt, Birtle, Manitoba; Recording Secretary, Mrs. W. F. Cameron, Davidson, Sask.; Corresponding Secretary, Miss Helen Beardmore, Port Credit, Ont.; Publicity Secretary, Mrs. J. F. Price, Calgary, Alta.; Treasurer, Miss Elizabeth Campbell, Fredericton, N.B.

WOMEN'S INSTITUTES IN QUEBEC

The 8th Annual Convention of the Quebec Women's Institute was held at Macdonald College in June. Miss Roach, Superintendent, reported that fifty-five institutes, with a membership of over one thousand four hundred, were now in operation. Among the activities reported were the providing of schools with musical instruments, equipment for school lunches, drinking fountains, provision for medical attendance, assistance to school fairs, the establishing and furnishing of community halls, and others.

THE AGRICULTURAL GAZETTE OF CANADA

Child Welfare Work is to receive special attention this year. By resolution it is decided to continue efforts to induce the Quebec government to allow women to sit on school boards; to ask for the continuation of the government grant of \$10 to each county and also an additional grant of \$2 for each local branch, to be used at the discretion of the county executive in extending the work of the institutes.

NOVA SCOTIA WOMEN'S INSTITUTES

The eighth annual convention of the Women's Institutes of Nova Scotia was held at the Agricultural College, Truro, on June 15 and 16. The report of Miss Helen J. Macdougall, Superintendent, stated that five demonstrators were employed during July and August of last year giving instruction in canning and food values. Most of the institutes were visited by demonstrators.

A short course for girls, occupying ten days, was held at the College. The instruction given included lessons in cookery, canning, food values, table setting and serving, dressmaking, and basketry. The students prepared and served their own meals.

A course of four lectures and demonstrations in home economics was given to adults in July and August, and again in January. The winter course instruction included, besides, cooking, nursing, gardening, and poultry keeping. Settlers' wives were also provided with a course in general household activities.

Ten new institutes were organized during the year, bringing the total up to seventy-two in the province.

The Committee on Agriculture reported sending out free to members of institutes instruction on gardening as well as one thousand packages of flower seeds and a quantity of roots of ornamental plants.

Plans were under way for the opening of correspondence courses in dressmaking, millinery, and cooking.

Resolutions were passed asking that the school curriculum and grading system be modified so as to give credit for technical knowledge and skill; recommending that greater attention be given in schools to patriotic exercises and other means of promoting love of country.

ALBERTA GIRLS' CLUBS HOLD CONVENTION

The Alberta Girls' Clubs affiliated with the Women's Institutes of the province, held a convention at the University, Edmonton, at the end of June. These clubs, numbering fifty-four, have a combined membership of about eight hundred young girls residing in rural districts. Addresses were given by Judge Emily Murphy, past president of the Federated Women's Institutes of Canada,

and Mrs. G. A. Gates, the girls' club director from the Women's Institutes. Community singing was engaged in at the various sessions. The programme was carried out almost entirely by the girls themselves.

Mrs. Gates impressed the convention with the great responsibility of the right training for girls entering into womanhood. She expressed the view that the clubs were doing much to develop individuality, and suggested various committees to keep the girls busy and interested. These committees were intended to develop the physical, the mental, and the social interests of each. She suggested the advantage of members using the meetings for developing their ability by reading aloud, reciting, conducting plays, and re-telling stories read by individuals. Games and physical culture were also recommended as an important part of the work of the clubs.

In a resolution passed the provincial government was asked to provide dormitories for girls at agricultural schools.

The presidential address referred to the value of the provincial club, and the importance of each club linking itself up with the other clubs.

The value of nature study was emphasized. This, perhaps, more than anything else, would incite a fuller appreciation of the beauties of nature, and in this way insure a favourable impression of rural life.

The following officers were elected:—President, Minnie Page, Elnora; first vice-president, Thelma Atkins, New Dayton; second vice-president, Clara Johnson, Alliance; secretary-treasurer, Olive Flemming, Alliance. The province is divided into four districts and for each a director was appointed.

THE QUEBEC SOCIETY FOR THE PROTECTION OF BIRDS

The Annual Report of the Province of Quebec Society for the Protection of Birds, 1920, contains a brief history of the work accomplished since the society was organized. The society has been especially active in arousing the interest of the children in bird protection. A large number of children have been enrolled in its membership, each signing a pledge card, and wearing the society's button.

Field days on Saturday afternoons during the spring and autumn months have been a feature of the work. Nesting boxes have been erected in parks and other suitable spots. School competitions were held for the making of bird houses, which were brought together for exhibition. Honorary game wardens were appointed by the society, and literature was distributed.

Following their appeal, the government of the province of Quebec established bird sanctuaries at Percé Rock, Bord Rock, in

the Magdalens, and portions of Bonaventure Island, off the Gaspé coast.

The junior membership of the society was reported to be 4,000, and the adult membership 250. The society is in affiliation with the National Association of Audubon Societies. Mrs. W. E. L. Dyer, Westmount, Que., is secretary.

THE ONTARIO DAIRY COUNCIL

The Ontario Dairy Council has issued a circular to the dairy farmers of the province soliciting their co-operation with a view to the proper development of the dairying industry. The circular points out that one of the chief needs is a better quality of raw material; the second is to increase the butter-fat content of the milk. To this latter end, dairymen are asked to encourage the establishing of cow-testing centres and the use of pure-bred sires. The Council promises to encourage and support exhibits of dairy products and carry on campaigns in co-operation with other organizations for the more general use of milk and dairy products. The circular outlines a plan for raising funds for the work of the council:—

(a) Cheese Factories, Creameries, Condensaries, Milk Powder Plants, and Milk Distributors for city and town trade will be asked to contribute—

One-third of a cent for every thousand pounds of milk received, or

One cent for every hundred pounds of butter-fat received.

The above contribution will be based on last year's business.

(b) The Dairy Farmers are asked to contribute—

One cent for each dollar received for milk or cream sold during the month of June. This payment will constitute the contributor a member of one of the dairy organizations of the province, and will be his total annual contribution for all purposes, including the National Dairy Council.

The circular points out the manner in which county organizations may co-operate in the activities of the council.

ONTARIO APPLE SHIPPERS' ASSOCIATION

The annual meeting of the Ontario Apple Shippers' Association was held at Presqu'île Point in July, and was attended by a large number of apple shippers, also by representatives of the various railway companies and ocean steamship lines. The election of officers resulted as follows: President, R. J. Graham, Belleville; Vice-President, W. J. Bragg, Bowmanville; Secretary, R. B. Scripture, Brighton.

UNITED FRUIT COMPANIES

The ninth annual meeting of the United Fruit Companies, Ltd., was held at Kent-

ville, N.S., in June, and was attended by over 200 delegates. The election of officers resulted as follows: President, F. W. Bishop; Vice-president, Ernest H. Johnson; Secretary, K. L. Pineo. A. E. McMahon was re-appointed general manager. The financial statement showed the best record ever made, the entire turnover amounting to \$3,292,549 at a cost of 1.1 per cent.

In reviewing the past season's operations, the president stated that the United Fruit Companies had been instrumental in chartering no less than 20 steamers for the carriage of fruit, potatoes and fertilizers.

ONTARIO HONEY CROP

The Ontario Beekeepers' Association has issued a final report of the white honey crop for 1921. The crop report committee of the association met in Toronto on July 21 and authorized the statement to be issued. Reports of the honey crop had been received from 442 members of the association, besides special reports from forty of the most prominent apiarists in different parts of the province. The reports showed that from 21,169 colonies, spring count, 1,591,278 pounds of honey had been produced. This is an average of about 75 pounds per colony. The quality is stated to be much better than it was last year, with the yield fairly well distributed over the province.

The committee recommended prices of 15 to 18 cents per pound for best quality, light extracted, wholesale, and 20 to 25 cents per pound to the consumer. For comb honey the price set was for No. 1, wholesale, \$2.50 to \$3.50 per dozen, and for No. 2 \$1.75 to \$2.50. The minimum price was recommended for barrels or whole crop, and the maximum price for part crop or honey in tins of 2½, 5, and 10 pounds.

THE WESTERN PLANT QUARANTINE BOARD

The Western Plant Quarantine Board, composed of representative quarantine officials from each of the Western United States, Mexico, Hawaiian Islands, and British Columbia, held their annual conference in Victoria, B.C., in the month of June. Many quarantine subjects were discussed. Those of greatest importance to Canada were sterilization of empty freight cars and other vehicles of transportation; rust and mite of the filbert, and white pine blister-rust. The prospective embargo on apples from fire blight districts in British Columbia and the United States was also discussed, and thorough consideration given to the question as to the possibility of apples from a blight-infested district carrying the bacteria to another country.

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SOUTHERN SASKATCHEWAN CO-OPERATIVE STOCK YARDS, LIMITED

The second annual meeting of the Southern Saskatchewan Co-operative Stock Yards Limited, was held at Moose Jaw, in June. Less than 4,000 cars of live stock were reported to have been handled during the past year, as compared with 11,000 cars the previous year. This is accounted for by the shortage of feed and corresponding abnormal conditions. The abattoir at the stock yards was to be re-opened for business this coming autumn.

The following officers were elected:—President, J. H. Grayson, Moose Jaw; Vice-President, O. Olafson, Mortlach; Secretary, A. W. MacPherson.

THE SASKATCHEWAN STOCK GROWERS' ASSOCIATION

The ninth annual convention of the Saskatchewan Stock Growers' Association was held at Maple Creek, Saskatchewan, late in June. The programme consisted of addresses on the state of the live stock industry by the Deputy Ministers of Agriculture for Saskatchewan and for Alberta, and the consideration and approval of a number of resolutions important to the live stock industry. These resolutions requested provincial and federal action to overcome the difficulties attending the marketing of live stock due to recent United States legislation; urging upon the Dominion government to purchase and control fence, corrals and dipping plant erected on the Matador Ranch, which will soon revert to the Crown; asking that rentals imposed on Forest and Indian Reserve pasture lands be reduced; urging elimination of scrub and grade males; approval of the Cattle Breeders' Association scheme of taxing all bulls in the province and of using the moneys thus secured to paying a bonus to owners of first-class sires.

The following officers were elected:—President, J. Byers, Valjean; Vice-President, O. Olafsen, Mortlach; Secretary, Hugh McKellar, Moose Jaw.

STOCK GROWERS' PROTECTIVE ASSOCIATION OF WESTERN CANADA

The annual convention of the Stock Growers' Protective Association of Western Canada was held in Calgary in the month of June. This organization has completed its amalgamation with the old Western Stock Growers' Association, with headquarters at Medicine Hat. The business of the meeting was largely to agitate for better conditions for cattle raisers in Western Canada. Among the important matters taken up were the renewal of grazing leases, the removal of the embargo against the admission of Canadian store cattle into Great Britain, the inspection of stock at feeding points and central markets, impounding, dipping regulations, and

cattle thieving. The following officers were elected: President, D. E. Riley, High River; 1st Vice-president, Geo. McElroy, Calgary; 2nd Vice-president, A. E. Cross, Calgary; secretary, W. F. Stephens, Calgary.

BRITISH COLUMBIA DAIRYMEN'S ASSOCIATION

The Dairymen's Association of British Columbia held a convention on June 6 at Vanderhoof, a northerly interior point in the province. Meetings were held at points passed during the journey of the delegation, which occupied six days. Addresses were given by the Minister of Agriculture and other officials of the department. A feature of the programme of the convention was a cattle judging competition for boys and girls. The prizes for the competition consisted of three pure-bred bull calves of the Ayrshire, Guernsey and Holstein breeds donated by representative breeders in the province. The winners were given the choice of the animals in the order of the proficiency of their judging. Cash prizes were also provided. The Secretary of the Association is Henry Rive, Dairy Commissioner, Department of Agriculture, Victoria.

WESTERN CANADA IRRIGATION ASSOCIATION

The fifteenth annual convention of the Western Canada Irrigation Association, held in Vernon, B.C., in July last, was attended by some two hundred delegates. The programme included the following speakers and subject:—Dr. John A. Widstoe, President of the University of Utah, "Excessive Irrigation and its Dangers," and "Some Odds and Ends in Irrigation Practice;" Professor F. A. Wyatt, of the University of Alberta, "The Action of Water on Soils;" W. F. Laimean, of Vernon, and A. Griffin, of Brooks, on "Irrigation District Problems;" R. H. Helmer, Superintendent of the Dominion Experimental Farm, Summerland, "Forage Crops under Irrigation;" Professor Barss, of the University of British Columbia, "Frost Protection in Orchards;" G. M. Stewart, of the Dominion Seed Branch, "Growing Alfalfa Seed for Market;" A. S. Dawson, Chief Engineer of the Canadian Pacific Railway's Irrigation Systems, "Wood Stave Pipe Construction;" L. G. Charlsworth, Chairman of the Alberta Irrigation Council, "Irrigation District Development in Alberta;" and A. C. R. Yuill "The Construction of Dams and Spillways;" a paper by Lionel Stevenson on "Overhead Irrigation as Practised on Vancouver Island" was read by W. J. Byker of Nelson, who added some interesting information with regards to the results obtained under this system near Creston, B. C. The officers elected for the ensuing year were: Honorary president, Sir James Loughheed, Minister of the Interior; President, Hon. J. A.

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Maharg, Minister of Agriculture for Saskatchewan; Honorary Vice-presidents: Hon. E. D. Barrow, Hon. T. D. Pattullo; minister of public works for Alberta; minister of highways for Saskatchewan; G. R. Marnock, Lethbridge, W. H. Fairfield, superintendent Experimental Farm, Lethbridge; Vice-presidents: D. J. Wylie, Maple Creek, and Walter Hockvale, Medicine Hat; Secretary, James Colley, Calgary.

CANADIAN FLORISTS' AND GARDENERS' ASSOCIATION

The convention of the Canadian Florists' and Gardeners' Association, held at Peterborough, Ont., in August, elected the following officers: President, W. E. Groves, Hamilton; First Vice-president, C. J. Hay, Brockville; Second Vice-president, F. D. Clark, Toronto; Secretary-treasurer, H. J. Eddy, Montreal.

THE LIBRARY

LIST OF MAJOR PUBLICATIONS RECENTLY ADDED TO THE DEPARTMENTAL LIBRARY, INTERNATIONAL INSTITUTE BRANCH, DEPARTMENT OF AGRICULTURE, OTTAWA.

A Course of Practical Physiology for Agricultural Students, by J. Hammond, M.A., and E. T. Halnan, M.A., School of Agriculture, Cambridge University. Cambridge University Press, 1920.

History of Canadian Wealth, by Gustavus Myers. Chicago, C. H. Kerr & Co., 1914.

Les mouvements des végétaux; du réveil et du sommeil des plantes, par René Dutrochet. Paris, Gauthier-Villars et cie., 1921.

The Physiology of Protein Metabolism, by E. P. Cathcart, M.D., D.Sc., F.R.S. London, Longmans, Green & Co., 1921. ((Monographs on biochemistry.))

The Plant Alkaloids, by T. A. Henry, D.Sc. (Lond.), F.C.S., Superintendent of Laboratories, Imperial Institute. London, J. & A. Churchill, 1913.

Light and the Behaviour of Organisms, by S. O. Mast, Ph.D. New York, John Wiley & Sons, inc., 1911.

An Introduction to the Study of Landscape Design, by H. V. Hubbard, Assistant Professor of Landscape Architecture, and Theodora Kimball, Librarian, School of Landscape Architecture, Harvard University. New York, Macmillan Co., 1917.

The Microscopy of Vegetable Foods with Special Reference to the Detection of Adulteration and the Diagnosis of Mixtures, by A. L. Winton, Ph.D. 2nd ed. New York, John Wiley & Sons, Inc., 1916.

Diseases of Economic Plants, by F. L. Stevens, Ph.D., Professor of plant pathology, University of Illinois, and J. G. Hall, M.A., rev. ed. New York, Macmillan Co., 1921.

Practical Biological Chemistry, by Gabriel Bertrand and Pierre Thomas, Faculté des sciences, Institut Pasteur, tr. from the third ed. by Hector A. Colwell, M.B. (Lond.), D.P.H. (Oxford). London, G. Bell & Sons, Ltd., 1920.

Pathogenic Micro-organisms, a Practical Manual for Students, Physicians and Health Officers, by W. H. Park, M.D., and Anna Wessels Williams, M.D., 7th ed. Philadelphia, Lea & Febiger, 1920.

The Butter Industry, by O. F. Hunziker, B.S.A., M.S.A. LaGrange, Ill., published by the author, 1920.

Agricultural Meteorology—The Effect of Weather on Crops, by J. Warren Smith, B.S.M.S. New York, Macmillan Co., 1920

Practical Botany, by F. Cavers, D.Sc., F.L.S., 2nd ed. London, University Tutorial Press, Ltd., 1920.

The Practical Book of Outdoor Rose Growing, by George C. Thomas, Jr. Garden edition. Philadelphia, J. B. Lippincott Co., 1920.

The Scientific Feeding of Animals, by Prof. Otto Kellner; authorized translation by William Goodwin, B.Sc., Ph.D., lecturer on agricultural chemistry, Southeastern Agricultural College, Wye, Kent. London, Duckworth & Co., 1915.

Fundamentals of Bacteriology, by C. B. Morrey, B.A., M.D., Professor of Bacteriology, Ohio State University. Phil., Lea & Febiger, 1921.

The Romance of the Microscope—An Interesting Description of its Uses in all Branches of Science, Industry, Agriculture, and in the Detection of Crime, by C. A. Ealand, M.A. Philadelphia, J. B. Lippincott Co.,

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Practical Meat and Food Inspection, by William Robertson, M.D. (Glas.), D.P.H., 2nd ed. London, Baillière, Tindall & Cox, 1920.

Handbook of Fungus Diseases of the Potato in Australia and their Treatment, by D. McAlpine. Melbourne, Kemp, 1911.

Agricultural Writers from Sir Walter of Henley to Arthur Young, 1200-1800 . . by Donald McDonald. London, Horace Cox, 1908. 228 pp., ill. facsimiles.

Sheep . . . by William Youatt. London, Robert Baldwin, 1837.

The World's Meat Future, by A. W. Pearse, F.R.G.S., 2nd ed. New York, E. P. Dutton & Co., 1920.

Précis d'extérieur du Cheval et des principaux mammifères domestiques; 2nd édition, par F. X. Lesbre, Directeur de l'Ecole nationale vétérinaire de Lyon. Paris, Asselin et Houzeau, 1920.

The Fur Trade of America, by Agnes Laut. Toronto, Macmillan Co. of Canada, 1921.

Condensed Description of the Manufacture of Beet Sugar, by Franz Murke, Ph.D., A.M. New York, John Wiley & Sons, Inc., 1921.

Flowers of Mountain and Plain, by Edith S. Clements, Ph.D., 2nd ed., New York, H. W. Wilson Co., 1920.

Vocational Chemistry for Students of Agriculture and Home Economics, by John J. Willaman, Ph.D. Philadelphia, J. B. Lippincott Co., 1921. (Farm life text series.)

Landscape Gardening, by Andrew Jackson Downing, 10th ed., revised by Frank A. Waugh. New York, John Wiley & Sons, Inc., 1921.

Modern Propagation of Tree Fruits by B. S. Brown, M.S., New York, John Wiley & Sons, Inc., 1916.

The Textile Fibres: their Physical, Microscopical and Chemical Properties, by J. Merritt Matthews, Ph.D., 3rd ed. New York, John Wiley & Sons, Inc., 1913.

A Text-book of Paper-Making, by C. F. Cross and E. J. Bevan; 5th ed. London, E. & F. Spon, Ltd., 1920.

British Poisonous Plants, by Charles Johnson. London, Taylor & Francis, 1856.

Forecasting the Crops from the Weather, by R. H. Hooker. (Reprint from Quarterly Journal of the Royal Meteorological Society, Vol. 47, April, 1921.)

Report on an Enquiry into a Uniform System and Standard of Meat Inspection in Scotland, by Lt.-Col. Gerald Leighton. Edinburgh, 1921.

Rothamsted Memoirs on Agricultural Science, Vol. IX. 1909-1916. Harpenden, Jeffery, 1919.

Agricultural History Society Papers. (Reprint from the Annual Report of the American Historical Association for 1918.

The Breeding and Feeding of Farm Stock, by James Wilson, London, Methuen & Co. Ltd., 1921.

Chemistry of Food and Nutrition, by Henry C. Sherman, Ph.D., 2nd ed. New York, Macmillan Co., 1920.

The Abolition of Money as the Basis of Human Peace and Equality, by Seijiro Kawashima, editor of the "Dai Nippon." Tokyo, 1920. 66 pp.

The Community Health Problem, by Athel C. Burnham, M.D., Toronto. Macmillan Co. of Canada, 1920.

Butterfly and Moth Collecting, by A. E. Hodge. London, C. Arthur Pearson, Ltd., 1919.

Trees in Winter, by A. F. Blakeslee and C. D. Jarvis. Toronto, Macmillan Co. of Canada, 1913.

The Science of Life: an Outline of the History of Biology and its Recent Advances, by J. Arthur Thomson, M.A. London, Blackie & Son, Ltd., 1920 (?)

The Story of a Great Agricultural Estate—Being the Story of the Origin and Administration of Woburn and Thorney, by the Duke of Bedford. 2nd ed. London, John Murray, 1897.

Vitamines—Essential Food Factors, by Benjamin Harrow, Ph.D. New York, E. P. Dutton & Co., 1921.

THE AGRICULTURAL GAZETTE OF CANADA

NEW PUBLICATIONS

DOMINION DEPARTMENT OF AGRICULTURE

Researches in Regard to Wheat, Flour and Bread. Bulletin No. 97, Experimental Farms Branch. By Chas. E. Saunders, B.A., the late Captain R. W. Nicholls, F.C.S., and P. Russel Cowan, B.S.A.

Swine Husbandry in Canada.—Bulletin No. 17 (Third Edition) of the Branch of the Live Stock Commissioner. By J. B. Spencer, B.S.A.

The Canadian Record of Performance for Pure-Bred Poultry—Section A—1919-20. Issued by the Poultry Division of the Live Stock Branch, contains Regulations, Standards, Forms and Records of Fowls qualified for certificates under Section "A."

Silo Construction.—Exhibition Circular No. 102 of the Experimental Farms.

White Burley Tobacco in Canada.—Bulletin No. 45 (Second Series). By H. A. Freeman, Tobacco Specialist, Central Experimental Farm.—This bulletin is a treatise on the growing and after treatment of White Burley Tobacco.

QUEBEC

Report of the Pomological and Fruit Growing Society of the Province of Quebec, 1920.—Published as a supplement to the report of the Minister of Agriculture. Contains report of the addresses at annual meeting and at summer meeting of the society.

NOVA SCOTIA

Proceedings of the Entomological Society of Nova Scotia for 1920, No. 6.—Issued by order of the Legislature of Nova Scotia.

MANITOBA

Report of the Department of Agriculture and Immigration, 1920.—Contains in summarized form a report of the work of each Branch of the Department for the year under review.

How to Preserve Eggs.—Circular No. 47 (Third Edition), by M. C. Herner, B.S.A., Professor of Poultry Husbandry, Manitoba Agricultural College.

The Western Wheat-Stem Saw-Fly.—Circular No. 57. By A. V. Mitchener, B.A., B.S.A., Lecturer in Entomology, Manitoba Agricultural College.

Chemistry of the Farm Water Supply.—Circular No. 58. By W. F. Geddes, B.S.A., Assistant Professor of Chemistry, Manitoba Agricultural College.

"*Poison Ivy*" is the title of a hanger printed in colours and issued from the Botany Department of the Manitoba Agricultural College.

SASKATCHEWAN

Wheat Marketing.—A report to the government of Saskatchewan, by James Stewart and F. W. Riddell, members of the Canadian Wheat Board. The report constitutes an outline of the present wheat marketing system and makes recommendation for its improvement.

Fourteenth Annual Report of the Secretary of Statistics.—Report on Saskatchewan's grain crops, live stock and grain marketing for the year ending April 30, 1921. Issued by the Department of Agriculture of that province.

BRITISH COLUMBIA

Locust Control.—Circular No. 63 of the Horticultural Branch of the Department of Agriculture.

Some Good Egg Recipes.—Circular No. 37 of the Live Stock Branch of the Department of Agriculture.

Climate of British Columbia.—Bulletin No. 27 of the Department of Agriculture. Contains tables of rainfall, snowfall, sunshine, and temperature for the year 1920.

Agricultural Statistics, 1920.—Bulletin No. 88 of the Department of Agriculture, Statistics Branch. This bulletin contains statistics of agricultural industries of the province. These statistics relate to the areas of lands under crop and under cultivation; products of the various crops; animals, animal products; and climate as affecting agriculture, determined by the means of the postal census taken in June through the joint efforts of the Dominion and Provincial Governments.

Starters for Farm Cheese-making.—By Wilfrid Sadler, Professor of Dairying, the University of British Columbia. Circular No. 1 of the Dairy Branch of the Department of Agriculture.

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Farm Cheese.—By N. S. Golding, Assistant Professor of Dairying, University of British Columbia. Circular No. 2 of the Dairy Branch of the Department of Agriculture.

Cottage Cheese.—By N. S. Golding, Assistant Professor of Dairying, University of British Columbia. Circular No. 3 of the Dairy Branch of the Department of Agriculture.

Clotted Cream.—By Wilfrid Sadler, Professor of Dairying, the University of British Columbia. Circular No. 4 of the Dairy Branch of the Department of Agriculture.

Fertilizers.—Bulletin No. 87 of the Department of Agriculture of British Columbia, issued from the Soil and Crop Division.

Goat Raising in British Columbia.—Bulletin No. 64, British Columbia Department of Agriculture, has reached its third edition in

the space of three years. A new edition places the number of goats in the province at about five thousand.

Agriculture in West Kootenay.—Circular No. 34. By W. J. Bonavia, Secretary, Department of Agriculture, Victoria, B.C.

The Calendar of the University of British Columbia, 1921-22.—Gives information regarding the course for students in agriculture.

MISCELLANEOUS

The Canadian Ayrshire Herd Book, Volume 30.—Contains pedigrees of animals numbering from 67021 to 74400. The volume also contains lists of the officers of the association to 1920; delegates to the Canadian National Ayrshire Breeders' convention, and illustrations of many prize winning animals and herds in 1920.

THE AGRICULTURAL PRESS

Agricultural Alberta, Edmonton, Alta.

July, 1921. *Use of Silage for Fattening Steers.* A. A. Dowell and G. F. Flack.
Cow Testing Work Carried to Success. A. H. White, Superintendent of Cow Testing.

The Canadian Countryman, Toronto, Ont.

August 6. *The Cost of Distributing Milk.* H. H. Dean, Professor of Dairy Husbandry, O.A.C., Guelph, Ont.

The Farmer's Advocate, London, Ont.

August 4. *The Relation of Freight Rates to the Steer Feeding Industry.* A. Leitch, Professor of Farm Economics and

Director of Farm Surveys, O.A.C., Guelph, Ont.

The Farmer's Magazine, Toronto, Ont.

July 7. *The U.S. Tariff and Dairy Products.* H. H. Dean, Professor of Dairy Husbandry, O.A.C., Guelph, Ont.

July 14. *Hints on the Storage and Culture of Fruits and Vegetables.* W. T. Macoun, Dominion Horticulturist, Dominion Experimental Farm, Ottawa.

The Nor' West Farmer, Winnipeg.

July 5. *Live Cattle and Chilled Meat Trade Compared.* H. S. Arkell, Canadian Livestock Commissioner.

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty,
International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

284.—The Effect of Milling on the Digestibility of Graham Flour.—LANGWORTHY, C. F. and BEUEL, H. J., in *Proceedings of the National Academy of Sciences*, Vol. V, No. 11, pp. 414-517. Washington, Nov., 1919.

In the United States, the bulk of the wheat used for flour is made into flour which contains 72% of the wheat kernel, called "Patent flour;" part is made into flour containing 85%, called "entire flour" or "whole wheat flour;" part is also made into flour which contains 100% of the wheat kernel, known as "Graham flour." The flour containing 72% has a much higher digestibility than that of the flour containing from 85% to 100%, as the coefficients of digestibility in Table I show:—

methods of milling on the digestibility of Graham flour. A Minnesota spring wheat was milled in 5 different ways; the flour was made into bread (with small quantities of lard, molasses, salt, ginger and baking powder), and the resulting bread was eaten by men with fruit (oranges), butter, sugar coffee or tea, in food tests. For determining the results the usual analytical methods were employed. The results of the digestion tests are set forth in Table II, in which the flours obtained by the various methods of milling are classed in increasing degrees of fineness. They show that the digestibility of the protein increases with the degree of fineness, as might be expected, for it has been shown (U.S. Dept. Agric. Bull. 751, 1919) that the protein of bran is digested to the extent of 44% in the case of fine bran, and 28% in the case of coarse bran; on the other hand, the digestibility of the carbohydrates

TABLE I—Co-efficients of Digestibility of Flours of Various Percentages.

	Tests by other authors.		Tests by the authors	
	Number of tests	Coefficients of digestibility	Number of tests	Coefficients of digestibility
Flour containing 72%:—	31		43	
Protein.....		88.1		89.5
Carbohydrate.....		95.7		99.9
Flour containing 85%:—	23		16	
Protein.....		81.9		87.1
Carbohydrate.....		94.0		98.3
Flour containing 100%:—	24		33	
Protein.....		76.9		84.2
Carbohydrate.....		90.1		94.4

The method of milling affects the size of the particles and the extent to which the walls of the aleurone cells are broken or weakened (while kneading, the walls of these cells are broken at the weak places). The authors investigated the effect of the various

varied slightly. In Table II, the estimated digestibility of the protein and the carbohydrates represent the digestibility of these constituents in the flour alone, after allowance has been made for the undigested residues of the other foods in the ration.

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TABLE II—Fineness and Average Digestibility of Graham Flour milled by Different Methods.

Method of millings	Percentage of flour passing through 100 sieve	Digestibility of the flour					
		Digestibility of the entire ration				Estimated digestibility of protein	Estimated digestibility of carbo-hydrate
		Protein	Fat	Carbo-hydrate	Ash		
	%	%	%	%	%	%	%
Laboratory roller mill.....	8.2	72.1	94.4	96.0	70.1	70.7	95.3
Commercial roller mill.....	22.8	72.1	95.6	95.4	67.6	70.4	93.8
Steel-burr mill.....	32.4	79.2	95.0	96.1	73.8	78.5	95.3
Attrition mill.....	36.6	75.5	92.9	96.1	69.7	74.5	95.4
Stone-burr mill.....	39.2	79.2	96.5	96.6	78.4	78.2	96.8

157.—The Nutritive Value of the Wheat Kernel and its Milling Products.—OSBORNE, T. B. and MENDEL, L. B., with the co-operation of FERRY, E. L. and WAKEMAN, A. J., in *The Journal of Biological Chemistry*, Vol. XXXVII, No. 4, pp. 557-601. Baltimore, April, 1919.

The authors undertook a detailed study of the composition and nutritive value of the wheat seed and its milling products, from the particular point of view of the problems arising from modern milling methods and the yield desired of the latter for general use. They review the literature on the composition of the embryo, the outer seed coats or bran, the endosperm and the whole seed, and they give the data extracted from this literature or obtained from their own investigations. The chief points are summarized in appended tables.

Applying the results to the question of the degree to which it is desirable to mill flour, the authors conclude that, except in special cases, little can be gained by including bran and embryo in the flour when this is used for human food under the conditions prevailing in the United States, where the greater part of the flour consumed is taken along with other foods which make good the nutritive deficiencies of its protein better than would be done by the proteins of embryo and of bran. Again, considering that the rations of farm animals require protein supplements and that wheat bran is a good source, the by-products of milling will be better utilized as food for animals than for man. Besides, as about 80% of the wheat kernel can be so improved in nutritive value by adding animal products to the diet that a much smaller amount of flour will satisfy the protein need of nutrition, it may well be that the use of the by-products of milling for the production of meat, milk, or eggs will result in a greater economy in the use of flour than if these were used directly for human food.

CROPS AND CULTIVATION

22.—The Influence of Cold in Stimulating the Growth of Plants.—COVILLE, F. V., in *Proceedings of the National Academy of Sciences*, Vol. 6, No. 7, pp. 434-435. Easton, Pa., July, 1920.

The author gives facts contradicting the generally accepted belief that in regions having a cold winter the native trees and shrubs become dormant because of the cold and that warm weather is of itself the sufficient cause of the beginning of new growth in the spring.

Dormant trees and shrubs which have had two or three months of chilling, either out of doors or in artificial storage, start into growth in the normal manner when spring comes, but, if the dormant plants have been kept warm all winter they do not start into growth at the usual time in spring but continue their dormant condition for weeks or months, sometimes for a whole year, and when finally they do begin to grow their growth is of an abnormal character. One of these long dormant plants can readily be started into healthy growth, however, even after the expiration of a year, by subjecting it to a period of chilling. The best temperature for chilling is 32° to 40° F. It may be applied in either light or darkness.

During the process of chilling the starch stored in the cells is transformed into sugar, and not until this has been done can the plant utilize its store of starch in making its spring growth. If warmth alone would start the plants into growth they would begin growing in Indian summer and the stored food that the plant requires for its normal vigorous growth in the following spring would be wasted in a burst of new autumn growth, which would be killed by the first heavy frosts, and would be followed by a winter of weakness and probable death.

Further investigations are necessary especially to determine the proper temperatures for the storage of different kinds of seeds, bulbs, cuttings, and grafting woods; proper temperatures for the treatment of plants which are to be forced from dormancy to growth at unusual seasons; and proper temperatures for the storage of nursery stock, so that the nurseryman may have plants in proper condition for shipment on any date he desires.

166.—The Influence of Pruning on the Resistance of Fruit Trees to Cold: Investigations in the United States.—WHITTEN, J. C., in *Monthly Weather Review*, Vol. XLVII, No. 8, p. 570. Washington, August, 1919.

The general condition of a plant at a given time, the degree of maturity or quiescence, the quickness of growth, have all a more or less marked influence on the plant's resistance to unfavourable surroundings.

Investigations made at the Missouri Agricultural Station have shown that sap concentration is least (minimum sugar content) during the periods of rapid growth in spring and at the beginning of summer.

The suspension or slowing of growth brings about an ever-increasing concentration of sap, with a rise in reserve stores. The earlier that growth stops in autumn, the greater will be the concentration of sap and the greater will be the quantity of reserve material.

On the other hand, as the degree of concentration increases, the freezing point becomes lower and thus the plant is able to stand lower temperatures than would be the case if the juices were weaker. For example, in a peach orchard, vigorous growth of branches continued up to the first autumn frosts. The following spring the blooms were killed in a single night by a fall of temperature to—2.78°C. In another orchard in the same district, growth stopped much earlier, while the leaves kept healthy and active until the first frosts.

The following spring the flowering buds were very resistant to frost.

Pruning.—With the old pruning methods, trees underwent every winter a very severe pruning which brought about a vigorous growth of shoots at the ends of the pruned branches. These shoots continued lengthening and producing leaves all summer, thus preventing the concentration of sap and the storage of reserve material.

With the new pruning system, on the other hand, the main branches are untouched; they are only cleared every year by the removal of useless side branches, so that growth stops early.

These branches and their leaves, of slow growth, have compact tissues, evaporate and transpire very little and thus keep their

sap concentrated. In addition, the leaves do not remove moisture from the fruit during dry seasons.

By this pruning system not only is resistance to low temperatures obtained, but also resistance to drought.

174.—A Review of the Literature on Tillage.—SEWELL, M. C., in *Journal of the American Society of Agronomy*, Vol. II, No. 7, pp. 269-309, bibliography of 70 publications. Lancaster, Pa., 1919.

The heaviest expense in producing cereal and annual forage crops is on account of tillage:—ploughing and cultivation. The depth and frequency of ploughing, the number of weedings have a material influence on the cost of production of a crop. The prevailing opinions on the subject are, however, so conflicting that a review of the literature relating to it is most opportune. After recalling to mind the forerunners (Tull, Priestley), then the classic agriculturists of the 19th century, and lastly modern authors, the author points out that the prevailing theories regarding deep and frequent ploughing are not founded on experimental data and he formulates the following conclusions:—

(1) Ploughing deeper than 7 inches does not generally cause an increased yield.

(2) Shallow ploughing may produce as great yields as deeper ploughing, but the depth less than 7 inches which is best for economic production has not been determined.

(3) There are not sufficient data to determine the expediency of frequent ploughing, but it appears that a suitable rotation of crops enables the number of ploughings to be decreased.

(4) Cultivation may be necessary only to extirpate weeds or to put the soil into condition for absorbing rainfall; it is therefore, practical, except in very heavy soils, to reduce the amount of cultivation where it is intended primarily to maintain a soil mulch.

(5) Many soils have naturally sufficient aeration, without cultivation, to insure optimum bacterial and chemical activity.

175.—Lime Requirements in the Soil Determined Chemically and Physiologically.—HARTWELL, B. L., PEMBER, F. R., and HOWARD, L. P., in *Soil Science*, Vol. VII, No. 4, pp. 279-282. Baltimore, 1919.

Experiments made with lettuce and beet (lime-loving plants) in pots containing a normal soil which had received a copious application of nitrogen, phosphoric acid and potash, plus varying amounts of slaked lime. Liming caused an increase in the yield, but after the maximum growth was reached, further liming did not further

increase growth, although the lime requirement of the soil was chemically still considerable. The addition of superphosphate to unlimed pots caused an increased growth in lettuce in spite of a markedly increased lime requirement in the soil as determined by chemical examination. This tends to show that the elimination of the effects of alumina in acid soils is of greater importance than the neutralization of the acidity.

177.—The Action of Some Common Fertilizers and Manures.—GREAVES, J. E., and CARTER, E. G., in *Soil Science*, Vol. VII, No. 2, pp. 121-160, bibliography of 165 publications. Baltimore, 1919.

After a full account of the works hitherto published in scientific literature on the various soil amendments and stimulants, the authors report some laboratory experiments on the action of various salts on the nitrogen and phosphorous of the soil in their various forms.

It stands confirmed that the sulphates of magnesium and calcium, the chlorides of sodium, potassium, magnesium and calcium, the nitrates of potassium, calcium and magnesium, also the salts of manganese and iron generally, can be efficient stimulants of soil fertility.

The stimulating action would be due, in certain cases, to an increase of available phosphorous in the soil, and in others to an increase in nitric nitrogen, increases caused by the action of the salts in question and sufficient to explain the additional yield corresponding to their application. A remarkable increase is that of nitric nitrogen, which, in the case of sulphate of calcium, may be as much as 97%. The increase of available phosphorous, either in the form of soluble phosphoric acid or in the form of organic phosphorous, was noted in all cases but two; namely, with nitrate of manganese and with carbonate of magnesium. The maximum increase in soluble phosphoric acid was caused with nitrate of magnesium (15.5%) the increase in organic phosphorus was greatest with carbonate of manganese (62.6%).

While sulphate of calcium is the strongest stimulant for rendering more nitrogen available, carbonate of manganese acts similarly for phosphorus in the combined increase of its two forms (soluble phosphoric acid and organic phosphorus).

181.—The Agricultural Value of Organic Manures.—RUSSELL, E. J., (Rothamsted Experimental Station), in *The Journal of the Board of Agriculture*, Vol. XXVI, No. 3, pp. 228-247. London, 1919.

Review of field experiments made in various places in England with different organic manures (rape cake, guano and

shoddy) compared with nitrate of soda, sulphate of ammonia and with farmyard manure, to determine experimentally whether the higher price paid for those organic manures was justified beyond the measure of their content of fertilizing elements (nitrogen, phosphoric acid and potash), in view of the fact that hitherto no well-defined field experiments had been made on the subject. From the experiments undertaken at Rothamsted (the most conclusive) with barley, wheat and mangolds, grown continuously on the same ground during 16 years, it appears that the nitrogen from rape cake in equal quantities is not so effective as that from nitrate of soda or sulphate of ammonia when they have been reasonably applied with sufficient quantities of phosphoric acid and potash. Further, rape cake has no residual effect on wheat or barley, while such effect is very marked, for at least two years, on mangolds; this is probably due to the very strong growth of their leaves which were ploughed into the soil each year.

Rotation experiments also showed that rape cake had little appreciable effect after the year of application.

Experiments on light soils at Woburn also did not show any superiority of rape cake over mixtures of nitrate of soda and other chemical manures.

Comparing, on a basis of equal amounts of nitrogen, the respective effects of Peruvian guano, rape cake and shoddy during the year of application, the values were in the ratio 100 : 91 : 88, with the difference that shoddy had a certain residual effect.

The preference, shown for rape cake and guano is only explained by the fact that they constitute compound manures (rape cake: nitrogen 4.75%, phosphoric acid 2%; Peruvian guano: nitrogen 6%, phosphoric acid 16%, potash 2%) capable of being applied without ill consequences even by inexperienced persons and in a single application, in large quantities (10 cwt. to 1 ton per acre in the case of rape cake), where chemical manures would have to be applied in several relatively small doses to avoid injury, especially to garden crops. Moreover, rape cake and guano are well adapted to the preparation of compound manures and facilitate their use with manure drills.

308.—Relative Resistance of Various Crops to Alkali. HARRIS, F. S. and PITTMAN, D. W., in *Bulletin No. 168, Utah Agricultural College Experiment Station*, pp. 1-23, 69 fig. Logan (Utah), July, 1919.

Different plants show considerable variation in their resistance to soil alkali. Some wild plants grow only where the salt content is high. On the other hand, most cultivated plants suffer continually in the presence of very large quantities of soluble salts; there

are a few exceptions to this rule, e.g., the date palm.

In many of the arid regions of the world the presence of alkali is one of the chief obstacles to the development of agriculture.

Between tracts completely free from alkali and those where the salt concentration is such as to prevent crops, there are very large zones of intermediate character where it is possible to introduce crops relatively less sensitive to the injurious action of alkali. The experiments described in the Bulletin under review were made with the object of studying the germination and growth of various crops in alkali soil; they dealt with numerous species of cultivated plants and several varieties of each species.

Crops tested:—14 varieties of oats, 8 varieties of wheat, 3 varieties of barley, rye, 7 varieties of maize, 3 varieties of millet, 5 varieties of sorghum, 8 types of forage legumes, 4 varieties of beans, 7 varieties of fodder grasses, 5 kinds of vegetables, sugar beet, buckwheat, hemp, flax, rape.

The different varieties of oats did not show any great difference in their resistance:—Boswell Winter, Red Rust Proof, Black and White Tartar, and Colorado No. 9 were slightly less resistant than the others. The lower concentrations of salts stimulated growth, and this stimulation continued up to 1,000 millionths for the chloride, 2,000 for the carbonate and 3,000 for the sulphate. Above these limits the number of plants obtained and their growth declined rapidly.

For wheat, similar conditions as for oats were observed. Turkey Red was the most resistant and Velvet Don the least resistant.

Among the varieties of barley tested, Black Hullless was the most resistant and Utah Winter the least.

Only one variety of rye was tested, and it showed itself very resistant.

The maize showed effects of toxicity at low concentrations, but was, however, resistant, and was able to grow considerably even at very high concentrations. In comparison with other crops, it seemed to be more sensitive to the action of sodium chloride than to that of the sulphate or carbonate. Millet showed similar resistance to maize.

Among the varieties of sorghum tested, *Collier's* showed itself most resistant, and *Milo Maize* the least so. *Vicia villosa* showed tolerance for chloride.

The growth of alfalfa ceased at a concentration slightly lower than that required for stopping the growth of *Melilotus alba*.

Of the grasses, the rye grasses were the most resistant though very sensitive; *Poa pratensis* was the least tolerant and is extremely sensitive; *Dactylis glomerata* was only slightly more resistant.

Rape was more resistant to chloride than to carbonate and sulphate; on the other

hand, sugar beets were stimulated by low concentrations of carbonate, but injured by chloride and still more by sulphate of sodium.

Kohl rabi was very resistant to sulphate at low concentrations, but was very sensitive to carbonate even of low concentration, and a concentration over 3,000 millionths stopped growth. Taken altogether, the data collected lead to the conclusion that the application of salts at concentrations higher than 4,000 millionths for chloride, 8,000 for carbonate and 12,000 for sulphate is injurious for ordinary crops. These figures would have to be modified if they were obtained from analysis of alkali soil, since the relation between alkaline chlorides and carbonates is not the same for "salts added" to the soil as for "salts extracted" from the soil.

In any case in land rich in salts the most suitable crops are cereals and the least suitable forage grasses. Of the forage crops may be recommended:—Vetches, *Melilotus alba*, alfalfa, and *Vigna Catjang*, but Timothy grass and Alsike clover are not advisable.

Borax Fertilizer Experiments.—BLAIR, A. W., in *New Jersey Agr.*, Vol. 2, No. 10, pp. 12-13, 1920.

Experiments conducted by the New Jersey Experiment Stations in co-operation with the U.S. Department of Agriculture on the influence of borax on the potato crop when mixed in different amounts with a standard fertilizer mixture are reported, showing that 30 lbs. of anhydrous borax per acre had only a slightly depressing effect on the yield even when applied in the row at the time of planting.

Fifty pounds of borax had only a slightly depressing effect when applied in the drill three weeks before planting. When applied in the drill at the time of planting there was definite injury and a decidedly depressed yield. Applications of 100 lbs. or over of borax per acre practically ruined the crop. Applying the fertilizer about three weeks before planting the potatoes reduced to a marked degree the toxic effect of the borax.

189.—The Composition of Cereal Grains: Mistakes Made in Locating the Chemical Constituents of Wheat and Rice Grains; Aleurone.—G. VARESCHI, I., in *Annali della R. Accademia di Agricoltura di Torino*, Vol. LXI, pp. 3-31. Turin, 1918.

The author examines critically several of the commonest treatises on botany, showing their mistakes regarding the location and nature of the chemical constituents of wheat and rice grains. He makes out that several authors confuse between aleurone (a mixture of albuminoids not yet well defined and separated) and gluten (a mixture of at least 5 albuminoids, among which glutenin and

gliadin, especially the latter, are typical), and he draws the following conclusions from his work:—

(1) True gluten is found only in wheat and rye grains.

(2) The albumen or kernel of wheat, rice and the other cereals contains not only starch but also always albuminoid material (gluten and non-gluten).

(3) The gluten, whether previously formed or not, exists with the starch in the albumen and not in the so-called "aleurone" layer, and in much more minute quantities in the outer coats. In wheat-seed albumen, starch does not exist alone, but is always associated with gluten. The quantity of gluten increases from the middle towards the outside of the albumen; it has not yet been proved whether the gluten pre-exists in the albumen or is formed by the action of water.

With the following reagent: 1 gm. Hofman violet + 50 gm. water + 6 to 8 gm. sodium bisulphite + 9 to 10 cc. hydrochloric acid at 1·19, it is easy to recognize the albuminoid materials in flour.

(4) It is easy to separate gluten from starch in wheat, but difficult to separate albuminoid from starch in rice.

Rice contains glutenin, glutencasein, glut-enfibrin, edestin or phytovitellin, but not gliadin, which is typical of true gluten. On the other hand, rye, like wheat, contains gliadin, glutenin and conglutin (which appears to be identical with edestin); it therefore contains a true gluten.

(5) It is erroneous to state that aleurone is synonymous with gluten.

(6) The term "aleurone" should be abolished, so as not to cause confusion, and replaced by the generic name "albuminous or protein matter."

192.—New Types of Wheat, Rye and Oats Obtained by Hybridisation and Selection at Svalof, Sweden.—NILSSON, N. HJALMAR, in *Sveriges Ullsädaförenings Tidskrift*, Year XXIV, No. 3, pp. 116-117. Malmö, 1919.

"203, Birgitta, 086" is a new kind of wheat obtained by crossing Smaahvede and Extra Squarehead II. From comparative cropping tests carried out in Östergötland it was found to be superior to Sol II in grain yield; it is much more resistant to attacks of the rhynchote *Cicadula (Jassus) sexnotata*.

In earliness it shows itself equal to the Sol variety, and is a type of wheat especially suited to the fertile land in the Östgota plain.

"204, 0955." This variety of wheat, the result of the cross Pansar × Fylgia, is destined to replace the Fylgia variety, to which it is plainly superior in its greater resistance to the rigours of winter and to rust and in the greater strength of its straw. It ripens earlier than the Pansar variety, and at the same time as Fylgia wheat.

"205, Stal, 0302," is a new variety of rye obtained as a pure line (by genealogical selection) from the Stiern variety, from which it is distinguished by its rather shorter and more robust straw, but it remains equal to the original variety both in quality of grain and in yield.

"209, 01180, b" is a new variety of oats obtained from the cross Seger × Kron, destined to replace the Kron variety.

"210, 01171, b" is a new variety of oats from the cross Seger × Gul Naesgaard and is destined to replace the Seger variety.

Flax Growing Experiments in Ireland.—*Journal of the Department of Agriculture and Technical Instruction for Ireland*, Vol. 20, No. 3, pp. 351-361. Dublin, 1920.

Variety tests and breeding work with flax, conducted during the period 1915-1919, are reported. The results obtained in fertilizer tests from 1901 to 1915, inclusive, are presented, and may be summarized as follows:—

Applications of potassium salts gave profitable increases, kainit and potassium chloride proving better than the sulphate. These salts gave similar results whether applied in winter or at the time of seeding. Where used in conjunction with 0·5 cwt. of ammonium sulphate, dressings at the rate of 1·5 cwt. of potassium chloride proved more profitable than 1 cwt.

Phosphatic fertilizers, alone, with potassium, or as part of a complete mixture encouraged weed growth at the expense of the flax, and their use was almost invariably attended by a loss, and very frequently even with smaller yields of scutched flax. The use of agricultural salt was not remunerative. The varied results obtained from the use of slow-acting nitrogenous fertilizers, such as rape meal, when in a mixture with kainit, did not recommend their uses in preference to either kainit or potassium chloride alone. The use of ammonium sulphate alone proved less profitable than when combined with potassium chloride, or potassium chloride alone. Lime applied to the preceding crop of oats following sod gave increased yields of flax. Applications containing soluble potassium fertilizers were the only kinds that prevented the flax sprouts from yellowing.

404.—Action of Heat on Sugar-Beet Seed.—SAILLARD, in the *Comptes rendus des Seances de l'Academie d'Agriculture de France*, Vol. VI, No. 5, pp. 91-92. Paris, February 4, 1920.

M. Tisserand has communicated to the Academy a note by M. Saillard (Director of the Laboratory of the Syndicate of Sugar Manufacturers) on the experiments he carried out with M. Vehrung as his co-worker on the action of heat on sugar-beet seeds.

The work was done with seeds of very good, good, and medium quality, which were heated in a thermo-regulated oven, while the germination tests were made on damp sand kept at 25°C.

The seeds of each quality were respectively heated for an hour to 40°, 50°, 60°, 70°, 80°, 90°, 100°, and 105° C., then germinated at 25° C. for 22 days together with unheated control seeds.

The following conclusions were arrived at:

(1) The seed clusters of the very good seeds with a 98% germination, and good commercial seed with an 87% germination, retain all their germination power when heated to 60°-70° C. as demonstrated by M. Schribaux.

(2) Bad seeds with a 36% germination, when submitted to the same temperatures, are mostly killed.

(3) A temperature of 80° C., even when maintained for 1 hour, does not alter the germination coefficients after 14 days with superior quality and good, ordinary quality seeds. It only retarded germination slightly.

These experiments will be of interest to those taking part in the competition opened by the French Ministry of Agriculture for the construction of a drying apparatus for beet seed that will enable them to be kept a long time, while leaving their germinating power unimpaired.

412.—**Degeneration in the Sugar-Beet and Its Remedy in Selection.**—CASSEL, L., in the *Bulletin de l'Association des Chimistes de Sucrierie et de Distillerie*, Vol. XXXVII, No. 4, pp. 131-140. Paris, October, 1919.

The flowering of the sugar-beet in its first year of growth is equally harmful to the grower, whose crop is reduced, and to the manufacturer as his root cutters wear out more rapidly. This anticipation of the flowering period has been explained by reference to heredity, but this is improbable because the sugar-beet is the product of long and careful selection, during which any suspected plants are rejected.

Commercial seeds come from parents and ancestors that have been rigorously controlled for a relatively long period (8 or 10 years). If heredity is excluded, then the problem of atavism comes in, seeing that cultivated selected plants tend, when the modifying action ceases, to return to the primitive type. In a wild state, beet is an annual plant, and it is only by means of prolonged selection that it has been possible to obtain the cultivated type which, during the first year, can store up the reserves which will enable it to grow and produce seed during the second year.

The tendency of the beet to "bolt" during the first year is, therefore, probably a sign of

reversion to the primitive type and a symptom of degeneration in the selected type.

In considering the causes that favour this process of degeneration, the author suggests that a plant submitted during its early growth to contrary conditions of soil and climate, which diminish its vitality, has a marked tendency to premature flowering. The author illustrates his theory by a number of examples taken from flower and fruit growing.

It is known that beets sown early give a higher percentage of "bolters" than beets sown later (normally). In the second case, the temperature is very high at sowing time, with the results that germination takes place rapidly and is complete in 10 to 12 days. Under these conditions the young plants are healthy and strong, remaining so up to an advanced stage of growth and accumulating large amounts of reserve material without flowering. On the contrary, if they are sown very early, they usually have to face cold and damp weather, germination is delayed, the early growth is weak and slow, and the plant, on the return of favourable growing conditions, tends to close its vegetative cycle prematurely as if, influenced by previous adversity, it feared to meet some new obstacle opposing the final act of reproduction of the species. Having gone so far, it now becomes a question either of abandoning early sowing or of submitting to the losses caused by bolting.

Besides the advantage consisting in the better distribution of the work, early sowing also leads to a greater production of sugar. Plants produced by early sowing, if not too injured by cold during their early growth, have attained, by the season of "second" heat, a development that enables them better to resist drought. In fact, the well developed roots penetrate to depths where the soil has most moisture and provide the plant with sufficient water to compensate for transpiration. If "bolting" can be avoided, the weight of roots and the sugar content will be greater.

The following measures are recommended in order to avoid the bad consequences (bolting) of early sowing:—

(1) Decortication of the seed, to facilitate germination.

(2) Shallow sowing, to aid emergence.

(3) Keep the soil loose for the young plants to emerge, without, however, breaking the surface layer up too much, as fine soil easily cakes under rain and thus prevents the young plants from coming up.

(4) Avoid premature thinning that would expose the isolated and still tender plants to a return of cold weather.

(5) The best method certainly consists in selection and crossing, carried out in such a

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way as to produce new types that resist cold and consequently capable of growing even under unfavourable conditions of temperature.

212.—A Possible Method for Retarding the Flowering of Fruit Trees.—DIENERT, F., in *Revue de Viticulture*, Year XXVI, Vol. LI, No. 1328, pp. 379-380. Paris, Dec. 11, 1919.

For a long time fruit growers have tried to get fruit at a time of the year different from the normal crop season. Fruit grown under glass in mid-summer fetches a very high price. By forcing crops in order to obtain these late fruits, however, a rest must be given to replace artificially the natural winter rest; this is done by means of anaesthetics or cold.

For certain fruits, it would be of advantage to obtain late crops; thus, for example, cherries sell much dearer in August than in June. If these could be got in September or at the beginning of October, their sale would be still more profitable (in any case, cherry trees need only a temperature of 47°F. for flowering).

In April, 1919, the author chanced on an experiment that showed how to obtain cherries late in the year. Following on the use of chlorine, the growth of a cherry tree in the open was affected by the vapour and stopped. In September one part of the tree flowered and in October another part. The September flowers yielded fruit about the end of October.

This chance experiment shows that by the proper use of an asphyxiating gas the growth of a tree placed in the open can be arrested and fruit can be had later than the normal season. In this direction there is a field for further investigation.

213.—Methods for Heightening the Colouring of Fruit.—TRUELLE, A., in *La vie agricole et rurale*, Year IX, No. 35, pp. 123-125. Paris, August 16, 1919.

Colour counts for a great deal in the market value of fruit, which has to satisfy the consumer not only in taste but also in appearance.

It is admitted that the red colour develops by preference in sunlight and when there are frequent alternations of warmth in the daytime and cooling off at night, as is generally the case in autumn. Morning dew also, according to Bechtle, has a favourable effect in this respect.

On the basis of these observations, the author advises two operations:—removal of leaves and watering.

Leaves should not be removed all at once or too quickly. They must be taken off one by one and on several different occasions, not by tearing them off, but by cutting

through the middle of the stalk, so as to spare the eyes at the base. They must be removed only in the evening or in dull weather, when transpiration is greatly reduced.

With the peach, which has a very sensitive epidermis, the process must be very gradual e.g., uncovering the fruit in three operations.

With the finest apple, in particular those of the "Api" variety, gardeners grow them in individual bags which they gradually tear off at ripening time. They even turn the apple on its stalk so as to expose several sides to the sun.

Leaf removal is practised also with "chasselas" grapes in order to get the golden colour.

Watering consists in spraying with a syringe in the September evenings, when the day has been warm, and aiming preferably at the side exposed to the sun, so as to bring about enlargement and colouring. M. Opoix, Chief Gardener at the Luxemburg Gardens in Paris, advises the use of water containing a handful of salt to every 10 litres of water.

LIVE STOCK AND BREEDING

219.—Typhoid Fever and Infectious Anaemia of the Horse.—BASSET, J., in *Comptes rendus de la Société de Biologie*. Vol. LXXXII, No. 31, pp. 1262-1263. Paris, December 6, 1919.

In previous papers (1) the author has shown:—(1) that typhoid fever in the horse is inoculable, being caused by a filtrable virus; (2) that the virus is present in the blood, where it remains *in vitro* for over 15 weeks, and in *in vivo* for about 5 months; (3) that a first attack of the disease confers complete and immediate resistance *experimentally* for at least four months, and *clinically* for 18 months; (4) that at the beginning the fever is present alone for 2 or 3 days, and that, consequently, in times of epidemic the thermometer serves to diagnose the start of the disease and ensures for the patients the best chances of recovery.

As doctors and experimenters have been struck by the close similarity in the symptoms shown by horses affected with typhoid fever and those suffering from the acute form of anaemia, the author tried to find out if it were a case of distinct morbid entities and to compare them. Experiments on the subject show that:

(1) The two diseases are absolutely distinct; (2) they are very different, because, contrary to typhoid fever, infectious anaemia is essentially chronic; in the case of anaemia, as in the chronic forms of many diseases due to microbes (tuberculosis, farcy, malaria, etc.) the equilibrium of the organism is at the mercy of a more or less mild, common, or specific cause.

The author proposes to base on these experimental results a method for diagnosing

anaemia. Diseases due to parasites visible in the blood having been eliminated, the diagnosis will be based on the remittance or intermittence of the fever. In the absence of spontaneous feverish attacks, these will be brought on by injection into the blood of serum from any horse. It is not at all necessary to bring about several attacks of fever; a single one brought on, appearing about 24 hours after the disturbing infection, will assure the diagnosis.

- (1) *Comptes rendus de l'Académie des Sciences*, August 21, 1911; *Recueil de méd. vétér.*, September 15, 1911, February 15, 1912; *Bul. Soc. cent. méd. vétér.*, March 12, 1912. (AUTHOR'S NOTE).

- 438.—Vaccination of Cattle Against Anaplasmosis.—LIGNIERES, J., in the *Bulletin de la Société de Pathologie Exotique*, Vol. XXII, No. 10, pp. 765-774. Paris, December 10, 1919.

By choosing the least virulent *Anaplasma argentinum*, or those from cattle that have long recovered, and passing them successively and at long intervals through the sheep and goat, such a fixity is attained in the attenuation of the parasite that they can be used almost without danger even for immunizing cattle against natural anaplasmosis.

The author now uses this new method on all the breeding cattle in the Argentine that are to be sent into regions where anaplasmosis exists.

- 348.—Genetic Studies in Poultry: Inheritance of Leg-Feathering.—PUNNETT, R. C. and BAILEY, P. G., in *Journal of Genetics*, Vol. VII, No. 3, pp. 203-213. Cambridge, May, 1918.

Results of experimental crosses between a breed with feathered legs (Langshan) and breeds with naked legs (Brown Leghorn and Gold-pencilled Hamburg).

Generally the F¹ fowls had slightly feathered legs; but there was considerable variation and one of the hens from a cross with the Hamburg breed had naked legs, and although crossed with a cock with naked legs, she produced progeny with feathered legs.

The F² generation of the cross with the Leghorn breed comprised 323 chickens with feathered legs and 106 with naked legs; the F³ generation of the cross with the Hamburg breed comprised 117 chickens with feathered legs and 31 with naked legs; there was, therefore, a close approach to the ratio 3 : 1.

Fowls of the F³ generation were, as far as could be judged, identified as homozygous for the character "leg-feathered." A few F³ fowls were even heavier leg-feathered than the Langshan breed. Chickens with moderately feathered legs crossed with

chickens having naked legs very often produced chickens with heavily feathered legs; in these cases a greater number of cocks were feathered in this way than hens. The author relies on the hypothesis of modifying factors to explain these facts.

On the basis of the data recorded by Davenport the writer suggests that the character "leg-feathered" in Cochinchina and Dark Brahma breeds depends on 2 factors.

- 239.—Bee-Keeping and Honey Production in the United States.—JONES, S. A., in *U.S. Department of Agriculture, Bulletin No. 685*, pp. 61. Washington, June 20, 1918.

Statement and discussion of numerous statistical data relating to bee-keeping and honey production in the United States. A series of tables gives for each State: the number of hives on farms, the percentage of total swarming in the various months, wintering (food and protection against cold), losses from disease and during wintering (causes and percentages), annual production of honey per colony, the total annual honey production, the form of honey produced, the colour of the honey, the disposal of the honey taken (domestic use or for market), the value of the export of American honey from 1911 to 1917, the import of honey into the United States from 1911 to 1917, the principal plants furnishing nectar and pollen with average dates of the beginning and end of flowering periods, the plants furnishing nectar and pollen for surplus honey (as distinct from that which the bees consume). In conclusion the geographical distribution of the more important honeys is given.

FARM MACHINERY

- Experience of Eastern Farmers With Motor Trucks.—TOLLEY, H. R. and CHURCH, L. M., in *U.S. Dept. of Agr. Bulletin 910*, pp. 37. Washington, D.C., 1920.

The results of a questionnaire indicating the experience of 753 farmers with motor trucks in the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, and Maryland, are reported.

The farms on which the trucks were used are of all sizes and types. The motor trucks varied in size from 1-2 to 5 tons, nearly half of them being 1-ton trucks, the preferred size. Only 18 per cent of the farms are less than 5 miles from the market, while nearly 25 per cent are 20 miles or more from the market.

The report indicates that the principal advantage of a motor truck is the saving of over half the time required by horses and

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grain year ends. There are only seven months for shipment of the new crop within our grain year. When the crops are large considerable quantities necessarily must be carried over to the following grain year so as to be distributed over the twelve months as is the case in the Northern Hemisphere. For none of the European countries do the above figures in the consumption column

include more than the needs for human food and seed, whereas, it is recognized that as a rule a considerable quantity of a country's wheat crop is not merchantable or even useful for such purposes and is in consequence fed to animals. Large stocks of grain held from an old crop, as has been seen in Australia, are frequently seriously affected by fungus and insect enemies.

LIVE STOCK STATISTICS

FRANCE

Classification	December 31, 1920	December 31, 1919	Increase (+) or decrease (-)	
			in number	per cent
Horses.....	2,542,820	2,413,190	+129,630	+ 5.4
Mules.....	178,470	167,180	+ 11,290	+ 6.8
Asses.....	297,540	303,100	- 5,560	- 1.8
Cattle.....	12,782,100	12,373,660	+408,450	+ 3.3
Sheep.....	9,372,360	8,990,990	+381,370	+ 4.2
Swine.....	4,583,470	4,080,560	+502,910	+12.3
Goats.....	1,228,580	1,174,860	+ 53,720	+ 4.6

BESSARABIA

Horses.....	421,307	402,679	+ 18,628	+ 4.6
Cattle.....	791,082	655,011	+136,071	+20.8
Sheep.....	2,031,752	1,593,925	+437,827	+27.5
Goats.....	14,885	15,714	- 829	- 5.3
Swine.....	541,290	345,778	+195,518	+56.5

MOROCCO

Horses and mules.....	119,000	173,664	- 54,664	-31.5
Asses.....	420,000	366,495	+ 53,505	+14.6
Oxen.....	1,300,000	1,322,173	- 22,173	- 1.7
Sheep.....	6,600,000	5,079,629	+1,520,371	+29.9
Goats.....	2,000,000	1,628,874	+371,126	+22.8
Swine.....	130,000	127,598	+ 2,402	+ 1.9
Camels.....	86,000	73,513	+ 12,487	+17.0

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WHEAT—SUPPLY SITUATION

Countries	Carry-over Aug. 1st, 1921	Production, 1921	Home Needs	Probable Export	Carry-over Aug. 1st, 1922-
	Bushels	Bushels	Bushels	Bushels	Bushels
Canada.....	10,000,000	288,000,000	98,000,000	185,000,000	15,000,000
United States.....	60,000,000	757,000,000	600,000,000	180,000,000	37,000,000
Argentina.....	66,000,000	175,000,000	80,000,000	110,000,000	51,000,000
Australia.....	42,000,000	110,000,000	45,000,000	80,000,000	27,000,000
Algeria.....		33,000,000		3,000,000	
Roumania.....		46,000,000		16,000,000	
Bulgaria.....		42,000,000		5,000,000	
Manchuria.....				12,000,000	
Total.....				591,000,000	

Prospective Imports.—The prospective demands of Europe, apart from Russia, are reduced in consequence of the considerably increased production of the European crops this year. Estimates of this increase vary between 120 and 160 million bushels. Table No. 5 shows an increase of 164 million bushels. Where official estimates of production are not yet available our estimate is based in part on increased acreage and especially on the excellent conditions reported from the great majority of the countries. The basis of our estimate was in most cases the official acreage multiplied by the actual per acre yield of the preceding year increased by three bushels per acre. This possibly in some cases will show excessive results as compared with the official figures which, are as yet wanting for a large number of countries. It is to be observed that Mr. Broomhall estimates the requirements of Europe, including those of Russia, at 536 million bushels. Granting Russia 40 million bushels of imports, which is perhaps more than the Allies under present conditions will be able to distribute there, our estimate of European requirements is 523 million bushels. However, Mr. Broomhall's estimate of only 56 million bushels for the rest of the world appears too low. The actual total net exports for the past year (ending August 1st 1921), in part unofficial, are given by other estimators at 658 million bushels. Not more than 560 million bushels of this can have gone to Europe, leaving 98 millions for the rest of the world. Hence, we believe our estimate of 70 million bushels for ex-European requirements in the current year is not excessive, for recent reports indicate that the crops of China and Manchuria are faring badly and the Manchurian wheat exports, of which we have reduced the estimate from 24 million bushels last year to 12 millions for this year, are not unlikely to go exclusively to China instead of to ex-Asiatic countries as was the case last year. In our calculations Jugo-Slavia and Hungary are removed from the import column as the improved appearance of their crops justify the expectation that they

will produce enough for their own needs and perhaps spare small quantities for contiguous countries.

An examination of the two tables representing demand and supply shows that the totals almost balance. This indicates a shortage of supply to satisfy the demand. As a matter of fact, within any given year the actual official exports have exceeded the recorded official imports by as much as 20 million bushels.

The European demand will be largely influenced by two other factors, viz.: the outturn of the rye crop and the coarser grains and potatoes. Very few official data are yet available from which to form a reliable estimate of the production of rye. Ten scattered countries that have so far reported have produced about the same quantity as last year. The Scandinavian countries that have suffered considerably from the drought this year will probably import a larger quantity of rye than usual. On the other hand, barley, oats and potatoes have been exceptionally affected by the drought: the German potato crop in particular is known to have suffered very severely. The coarser cereals and potatoes have in recent years been mixed with the flours of other cereals for bread-making, hence the possibility of increased demand for wheat and rye.

Prospective Exports.—In the above table the export of only 180 million bushels is granted to the United States as against 200 million bushels estimated by others, including Mr. George Broomhall. It is evident that in order to spare that quantity for export the United States would have to reduce their consumption to a point below normal. We allow only 600 million bushels, which may be compared with an estimate made by the International Institute earlier in the year of 612 million bushels for the past grain year. The quantities in the table granted to the Southern Hemisphere are large compared with the shipments that have been actually made in other years between the first of January and the first of August when our

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Broomhall and those of the U.S. Bureau of Crop Estimates. The information, such as it is, is the best obtainable at this date and may be of practical interest to many.

Tables Nos. 6 and 7 for rye and barley, referring to only a few countries that have so far made official reports, exhibit a production very nearly equal to that of last

year. On the other hand, oats shows the big reduction of 437 million bushels. The United States and Canada together a reduction of 462 million bushels, while Europe shows an increase which is striking in the case of Algeria, Tunis and Italy. In fact, the same remark applies to these three countries' production of all the cereals.

MONTHLY EXPORTS OF WHEAT AND FLOUR, 1920-21

(Flour reduced to equivalent quantities of wheat)

Months	Canada	United States	India	Australia	Argentina	Total five countries
	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels
1920						
August.....	6,065,000	32,550,000	22,000	2,257,000	6,420,000	47,314,000
September.....	5,321,000	34,994,000	29,000	2,612,000	3,144,000	46,100,000
October.....	19,114,000	43,033,000	31,000	2,948,000	871,000	65,997,000
November.....	29,483,000	30,989,000	340,000	1,515,000	223,000	62,550,000
December.....	37,468,000	30,179,000	1,334,000	1,650,000	79,000	70,710,000
1921						
January.....	14,612,000	27,105,000	3,309,000	8,834,000	1,713,000	55,573,000
February.....	11,983,000	23,075,000	1,961,000	10,968,000	6,627,000	54,614,000
March.....	11,179,000	20,763,000	2,046,000	10,738,000	7,790,000	52,516,000
April.....	7,392,000	24,801,000	684,000	14,432,000	12,900,000	60,209,000
May.....	10,442,000	31,624,000				
June.....	8,412,000	32,192,000				
July.....	5,743,000	30,413,000				
Total for grain year 1920-21.....	167,214,000	361,718,000 ^b	11,656,000 ^a	84,366,000 ^a	64,510,000 ^a	689,464,000
Manchuria.....						24,000,000
						713,464,000 ^b

^a Details for last 3 months not available.

^b It should be remembered that the United States imported some 54,000,000 bushels of wheat from Canada during the grain year. The total net exports of North America and of the world are therefore really smaller by 54,000,000 bushels than as given above.

WHEAT—DEMAND SITUATION

Countries	Crops 1921	Probable Imports
	Bushels	Bushels
Great Britain and Ireland.....	57,000,000	210,000,000
France.....	282,000,000	50,000,000
Italy.....	188,000,000	55,000,000
Portugal.....	7,000,000	4,000,000
Greece.....	11,000,000	10,000,000
Belgium.....	8,000,000	40,000,000
Netherlands, Switzerland, Norway, Sweden and Denmark.....	25,000,000	30,000,000
Egypt, Mesopotamia, Constantinople and Turkey.....		15,000,000
Germany.....	100,000,000	50,000,000
Austria, Poland and Czecho-Slovakia.....	30,000,000	20,000,000
Russia.....		40,000,000
Total Europe and Mediterranean.....		524,000,000
Ex Europe.....		70,000,000
WORLD'S AGGREGATE REQUIREMENTS.....		594,000,000

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Table 6

RYE

Countries	1921	1920	Average 1915-19
	Bushels	Bushels	Bushels
Belgium.....	19,172,000	18,169,000	7,315,000
Bulgaria.....	7,566,000	9,798,000	5,856,000
Spain.....	27,768,000	27,830,000	26,566,000
Finland.....	11,265,000	9,173,000	9,835,000
Alsace-Lorraine.....	2,968,000	2,258,000	1,530,000
Greece.....	3,151,000	1,360,000	929,000
Italy.....	5,118,000	4,539,000	4,794,000
Hungary.....	18,924,000	20,564,000	.....
Canada.....	11,707,000	11,306,000	5,586,000
United States.....	64,332,000	69,318,000	69,159,000
Total.....	171,971,000	174,315,000	131,570,000a

a Less Hungary.

Table 7

BARLEY

Countries	1921	1920	Average 1915-19
	Bushels	Bushels	Bushels
Belgium.....	4,419,000	4,350,000	3,449,000
Bulgaria.....	12,685,000	13,926,000	10,266,000
Spain.....	92,189,000	90,463,000	83,978,000
Finland.....	4,047,000	4,983,000	4,747,000
Alsace-Lorraine.....	3,900,000	3,300,000	2,550,000
Greece.....	6,430,000	7,026,000	6,025,000
Italy.....	11,023,000	5,870,000	9,319,000
Canada.....	58,027,000	63,311,000	57,104,000
United States.....	170,511,000	202,204,000	208,098,000
Japan.....	89,301,000	92,140,000	95,543,000
Algeria.....	32,406,000	9,425,000	38,163,000
Morocco.....	26,022,000	39,645,000	30,993,000
Tunis.....	13,550,000	2,622,000	8,377,000
Total.....	544,510,000	539,265,000	558,612,000

Table 8

OATS

Countries	1921	1920	Average 1915-19
	Bushels	Bushels	Bushels
Bulgaria.....	10,412,000	9,529,000	6,236,000
Spain.....	32,687,000	35,550,000	31,165,000
Finland.....	19,538,000	23,116,000	23,734,000
Alsace-Lorraine.....	9,350,000	8,202,000	5,921,000
Greece.....	3,891,000	3,761,000	3,406,000
Italy.....	35,663,000	22,798,000	32,274,000
Canada.....	457,544,000	530,710,000	419,775,000
United States.....	1,137,202,000	1,526,055,000	1,432,697,000
Algeria.....	17,583,000	4,669,000	14,639,000
Tunis.....	4,215,000	1,394,000	3,437,000
Total.....	1,728,085,000	2,165,784,000	1,973,284,000

According to estimates in Table No. 5 the world's production of wheat this season will be practically the same as that of last year. There is an increase of only 10 million bushels shown in the grand totals. It is, on the other hand, omitting Hungary, Poland and Jugo-Slavia, for which no estimates of the pre-war average are available, 96,000,000 bushels larger than the average pre-war production. The European pro-

duction exceeds that of last year by 164 million bushels, and is very nearly equal to that of the pre-war period. However, we must warn the readers of the "Gazette" against drawing any hard and fast conclusions from these estimates because so many of them are not official and are merely based on acreage and condition reports, although, on the whole, they agree pretty closely with the estimates of Mr. George

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PRODUCTION OF CEREALS

Table 5

WHEAT

Countries.	1921	1920	Prewar average 1909-13
<i>Europe—</i>	<i>Bushels</i>	<i>Bushels</i>	<i>Bushels</i>
Germany.....	100,000,000 ^a	82,859,000	113,100,000 ^b
Austria.....	6,900,000 ^a	5,494,000	5,422,000 ^b
Belgium.....	7,668,000	10,275,000	14,894,000
Bulgaria.....	41,741,000	41,190,000	29,308,000 ^b
Denmark.....	7,000,000 ^a	6,945,000	5,344,000
Spain.....	143,205,000	138,606,000	130,447,000
Jugo-Slavia.....	78,000,000 ^a	64,712,000	.....
Finland.....	276,000	272,000	251,000
France.....	282,000,000 ^a	230,406,000	317,639,000
Alsace-Lorraine.....	8,271,000	5,907,000	3,763,000
Great Britain and Ireland.....	57,000,000 ^a	56,898,000	59,640,000
Greece.....	11,170,000	12,194,000	9,400,000 ^b
Hungary.....	41,900,000	38,295,000	.....
Italy.....	188,128,000	141,338,000	183,336,000
Luxemburg.....	500,000 ^a	449,000	615,000
Norway.....	500,000 ^a	1,035,000	306,000
Netherlands.....	7,000,000 ^a	6,677,000	4,896,000
Poland.....	23,000,000 ^a	18,258,000	.....
Portugal.....	7,000,000 ^a	7,140,000	7,440,000
Roumania (former kingdom).....	46,000,000 ^a	24,000,000	57,896,000 ^b
Sweden.....	7,000,000 ^a	10,528,000	8,103,000
Switzerland.....	3,600,000 ^a	3,586,000	3,314,000
Czecho-Slovakia.....	30,000,000 ^a	26,167,000	23,541,000 ^b
Total Europe.....	1,097,859,000	933,231,000	978,655,000 ^c
<i>North America—</i>			
Canada.....	288,493,000	263,189,000	197,118,000
United States.....	756,825,000	787,128,000	686,697,000
Total North America.....	1,045,318,000	1,050,317,000	883,815,000
<i>Asia—</i>			
India.....	246,250,000	376,766,000	359,035,000
Japan.....	28,370,000	28,288,000	24,166,000
Total Asia.....	274,620,000	405,054,000	383,201,000
<i>Africa—</i>			
Algeria.....	33,150,000	8,561,000	34,998,000
Egypt.....	32,000,000 ^a	31,711,000	34,121,000
Morocco.....	20,040,000	22,000,000	18,202,000 ^b
Tunis.....	11,758,000	5,225,000	6,230,000
South Africa.....	8,000,000 ^a	8,113,000	6,520,000
Total Africa.....	104,948,000	75,610,000	100,071,000
<i>South America—</i>			
Argentina.....	175,000,000 ^a	184,930,000	148,908,000
Chili.....	27,000,000 ^a	27,161,000	14,000,000
Uruguay.....	10,000,000 ^a	10,321,000	6,519,000
Total South America.....	212,000,000	222,412,000	169,427,000
<i>Australasia—</i>			
Australia.....	110,000,000 ^a	146,795,000	90,500,000
New Zealand.....	6,000,000 ^a	5,974,000	7,070,000
Total Australasia.....	116,000,000	152,769,000	97,570,000
Grand Total.....	2,850,745,000	2,839,393,000	2,612,739,000 ^c

^a Estimates based on condition and acreage.

^b Average 1915-19.

^c Less Jugo-Slavia, Hungary and Poland.

THE AGRICULTURAL GAZETTE OF CANADA

Table 2

RYE

Countries	1921	1920	Average 1915-19
	acres	acres	acres
Belgium.....	523,000	523,000	400,000
Bulgaria.....	455,000	452,000	467,000
Spain.....	1,772,000	1,799,000	1,819,000
Finland.....	605,000	603,000	589,000
France.....	2,054,000	2,001,000	1,989,000
Alsace-Lorraine.....	110,000	108,000	88,000
Greece.....	222,000	131,000	62,000
Hungary.....	1,291,000	1,248,000	.....
Italy.....	297,000	282,000	280,000
Luxemburg.....	20,000	20,000	20,000
Norway.....	36,000	36,000	46,000
Poland.....	6,872,000	7,236,000	.....
Roumania.....	500,000	681,000	.....
Czecho-Slovakia.....	2,209,000	2,230,000	.....
Canada.....	728,000	650,000	358,000
United States.....	4,544,000	5,043,000	4,831,000
	22,238,000	23,043,000	10,949,000 ^a

^a Less Hungary, Poland, Roumania and Czecho-Slovakia.

Table 3

BARLEY

Countries	1921	1920	Average 1915-19
	acres	acres	acres
Belgium.....	91,000	90,000	78,000
Bulgaria.....	482,000	545,000	564,000
Spain.....	4,227,000	4,319,000	4,029,000
Finland.....	297,000	293,000	285,000
France.....	1,527,000	1,449,000	1,514,000
Alsace-Lorraine.....	121,000	118,000	98,000
Scotland.....	192,000	204,000	161,000
Hungary.....	1,173,000	1,201,000	.....
Italy.....	544,000	494,000	526,000
Luxemburg.....	5,000	5,000	6,000
Norway.....	156,000	156,000	125,000
Poland.....	2,298,000	1,944,000	.....
Canada.....	2,539,000	2,552,000	2,343,000
United States.....	7,713,000	8,083,000	8,155,000
Morocco.....	1,955,000	2,341,000	2,034,000
Tunis.....	988,000	934,000	1,209,000
Algeria.....	2,520,000	2,444,000	2,870,000
	26,828,000	27,172,000	23,997,000 ^a

^a Less Hungary and Poland.

Table 4

OATS

Countries	1921	1920	Average 1915-19
	acres	acres	acres
Bulgaria.....	302,000	332,000	342,000
Spain.....	1,553,000	1,588,000	1,460,000
Finland.....	1,038,000	1,013,000	980,000
France.....	8,073,000	8,166,000	7,385,000
Alsace-Lorraine.....	255,000	252,000	210,000
Scotland.....	1,049,000	1,032,000	1,074,000
Hungary.....	798,000	800,000	.....
Italy.....	1,186,000	1,159,000	1,152,000
Luxemburg.....	62,000	62,000	61,000
Norway.....	342,000	342,000	329,000
Poland.....	4,380,000	4,119,000	.....
Canada.....	15,396,000	15,850,000	13,122,000
United States.....	44,829,000	43,323,000	42,452,000
Algeria.....	554,000	574,000	575,000
Tunis.....	148,000	149,000	153,000
	79,965,000	78,761,000	69,295,000 ^a

^a Less Hungary and Poland.

THE INTERNATIONAL REVIEW OF AGRICULTURAL ECONOMICS

The following is a brief indication of the contents of the more important articles in the March, 1921, number of the Institute Economic Bulletin. Persons interested in any of the articles may obtain the original Bulletin on application to the Institute Branch, Department of Agriculture, so long as the supply for distribution is not exhausted.

The Official and Voluntary Organization of Agriculture in Belgium.—13 pages. A short account of the movement in favour of rural organization in Belgium is given, then the official organization of agriculture in that country is discussed. The article deals with agricultural clubs, farm-women's clubs, beekeepers' societies, live stock breeding societies, societies or syndicates for the purchase of seeds, fertilizers, cattle feeds, etc., co-operative dairies, agricultural credit societies, Raiffeisen banks, central agricultural credit banks and Schultze-Delitsch banks.

The Sleeping Accommodation of Agricultural Labourers in France.—9 pages.

Some of the shorter articles are: The Co-operative Agricultural Movement in Czecho-Slovakia; The Swiss Union of Raiffeisen Credit Banks in 1919; Live Stock Insurance in Bohemia; The Provident Land Clubs in Spain; Mortgage Credit in Holland in 1919; Mortgage Credit in Switzerland in 1919; Wages and Distribution of Foreign Agricultural Labour in France; Agricultural Wages in Sweden in 1919; Alienation and Division into Lots of Uncultivated Lands Belonging to the State and Administrative Bodies in Portugal; Agricultural Colonization of the Pampa in Argentina; The Agrarian Reforms in Esthonia; The Cultivation of Uncultivated Lands in Mexico Declared to be a Work of Public Utility; The System of Purchase and Distribution of Grain and Flour in Spain.

AGRICULTURAL STATISTICS

THE CEREAL CROPS OF 1921.

REVIEW OF THE SUPPLY AND DEMAND SITUATION.

AREA OF CEREAL CROPS

Table 1

WHEAT

Countries	1921	1920	Average 1915-19
	acres	acres	acres
Belgium.....	305,000	306,000	287,000
Bulgaria.....	2,367,000	2,131,000	2,327,000
Spain.....	10,357,000	10,255,000	10,227,000
Finland.....	20,000	19,000	18,000
France.....	12,855,000	12,097,000	11,744,000
Alsace-Lorraine.....	310,000	288,000	226,000
England and Wales.....	1,978,000	1,875,000	2,156,000
Scotland.....	57,000	54,000	52,000
Greece.....	988,000	1,399,000	1,024,000
Hungary.....	2,606,000	2,082,000	.....
Italy.....	11,491,000	11,290,000	11,224,000
Luxemburg.....	27,000	27,000	25,000
Norway.....	41,000	41,000	26,000
Poland.....	1,569,000	1,791,000	.....
Roumania.....	4,642,000	5,156,000	.....
Czecho-Slovakia.....	1,428,000	1,567,000	.....
Canada.....	18,736,000	18,232,000	16,343,000
United States.....	56,744,000	57,192,000	57,873,000
India.....	25,127,000	29,864,000	30,916,000
Algeria.....	2,782,000	2,648,000	3,179,000
Morocco.....	1,462,000	1,997,000	1,551,000
Tunis.....	1,334,000	1,343,000	1,459,000
	157,226,000	161,654,000	150,657,000a

a Less Hungary, Poland, Roumania and Czecho-Slovakia.

bonate, besides being a perfect fungicide, is innocuous to the seed and has the advantage that it can be used in the dry state.

The method finally adopted for treating wheat seeds consists in powdering the seed with dry copper carbonate in the proportion of 2 per 1000. It was found to be essential to cover the seed completely with the copper carbonate powder, which can be better done by using a machine that mixes the wheat and copper carbonate together intimately than by doing it by hand.

The results of cultural tests made in 1917 and 1918 at the Wagga and Cowra Experimental Farms (New South Wales) showed an actual, marked increase in the yield per acre in the cases where the new copper carbonate treatment substituted the old method using a bath of copper sulphate. This increase is positive and, in certain cases, amounts to 100%.

The advantages derived from the use of copper carbonate instead of copper sulphate can be summarised as follows:—

- (1) No water is used.
- (2) There is no injurious action on either seed or young plant such as occurs with copper sulphate.
- (3) Seed wheat can even be treated several weeks before sowing.
- (4) No harm comes to the seed if it remains on a dry soil for several weeks without germinating.
- (5) Better germination is obtained.
- (6) This method is quicker and less laborious than using copper sulphate solution.
- (7) A better product is obtained.
- (8) The total quantity of seed grain required for sowing can be treated when the farmer can best spare the time and not necessarily a day or two before sowing.

INJURIOUS INSECTS

374.—Comparative Action of Chloropicrin on the Injurious Beetles *Calandra Oryzae* and *Tribolium Navale* (= *T. ferrugineum*)
BERTRAND, G., BROcq-ROUSSEU and DASSONVILLE, in *Comptes rendus hebdomadaires des seances de l'Academie des Sciences*, 2nd Half-year, 1919, Vol. CLXIX, No. 26, p. 1428-1430. Paris, 1919 (f).

Tribolium navale F. (= *T. ferrugineum* F.), which lives in the caryopses of damaged cereals, in bran, old flour, etc., has been observed by the authors, but only in smaller numbers, in maize, more strongly attacked by *Calandra oryzae*. According to a preliminary experiment it appeared to the authors that *T. navale* is unable to attack healthy caryopses, and that it is only able to live on those which are already perforated by *C. oryzae*. It causes less extensive

damage than that caused by the other beetle, but nevertheless its destruction is necessary especially in certain determined cases.

It may be supposed that the treatment of caryopses with chloropicrin, in the circumstances previously indicated by the authors, would destroy, at the same time, *C. oryzae* and the other parasites which eventually accompany it. But the authors have shown that, restricting themselves to the limits in strength and time which assure the death of *C. oryzae*, the *Tribolium* beetles resist; and the separation of the two parasites is, so to speak, quantitative.

Does *T. navale* protect itself better than *C. oryzae* in the interior of caryopses? Is it less sensitive to the action of the toxic vapour? In order to prove this the authors measured, in a series of parallel experiments, the comparative action of chloropicrin on *T. navale* and *C. oryzae* proceeding as in their previous experiments.

The results obtained were as shown in a table, the insects being collected in groups of 10, the capacity of the flask being 8 litres, and the temperature between + 14° and + 19° C.

These results show clearly that the cause of the separation of the species of insects in the treatment of the infested caryopses is explicable by their unequal resistance to chloropicrin.

The comparative measures have been completed by the following experiments:—

(a) In 2 8-litre flasks were placed 6 litres of maize containing *C. oryzae* and *T. Navale*; in the first flask was placed a dose of chloropicrin corresponding to 25 gm. per cubic metre, and into the second a dose corresponding to 30 gm; after 24 hours all the *C. oryzae* beetles were dead and about 50% of the *T. navale* beetles remained alive.

(b) The conditions were the same as those in the preceding experiment but the time was longer; after 24 hours only the *C. oryzae* beetles were dead; after 60 hours all the *T. navale* beetles were also dead.

(c) As in *a* and *b* but increasing the quantity of chloropicrin; with 38 gm. per cubic m. after 48 hours there were still some *T. navale* beetles alive; with a dose of 40 gm. and after the same time all the insects were dead.

From a practical standpoint it is easy, on a basis of the quantitative results obtained, to determine the necessary conditions for the simultaneous destruction of the two species of beetles. The authors have succeeded, in the case of maize, in treating caryopses enclosed in sacks, exactly as they have described in the case of *C. oryzae*, but allowing the chloropicrin to act for at least 24 hours.

for an established rule among farm accountants that in pure-bred stock production milk is a by-product and the cost of feed in animal production is not chargeable to milk.

Importance of Studying Farm Practice.—Crop yields and production per animal are important factors in profitable farming, therefore any practice that will increase crop yields and production per animal will be not only of economic interest, but will increase the food supply. Experiment station results clearly point out methods for increasing production, but these conclusions may be confined to certain types of soil. Just as important results have been worked out by farmers under much more widely varying conditions; hence, the study of farm practice should be an important field of work.

Farm management surveys may help to analyse economic problems, but the story of how soils have been made productive through systems of rotation with clover, alfalfa, soya beans or other legumes, and the methods practiced in the use of cover crops, manure, lime and fertilisers, will help to interpret the figures obtained from surveys. Farm management surveys provide a basis for the analysis of systems of farm organization and the results from certain operations. Farm practice studies, on the other hand, will show the methods employed and why certain results are obtained. It gives additional information necessary to work out a complete farm plan. There is an unlimited field for work of this sort which will go far towards developing standards for farm operations.

Co-operative Investigations.—Progress in the study of economic problems will develop more rapidly, and the results of investigations will be applied more successfully by the most earnest co-operation between the United States Department of Agriculture and state agricultural institutions; between the investigator or demonstrator and the farmer.

The state institution is restricted in territory, whilst the federal department can study regions which may include several states.

There is a great amount of data which have been obtained through surveys, and which would make an interesting field of study if these data could be assembled and correlated. Instead of dealing with a few hundred or less, there might be several thousand records, which, when assorted, would give much larger groups and a basis for more accurate conclusions. It would give an opportunity for the study of selected types of farming, the profitableness of different combinations of enterprises, and of many other problems, hitherto impossible.

AGRICULTURAL INDUSTRIES

464.—Transport of Milk in Frozen Blocks.—*Le Froid*, Vol. VII, No. 12, p. 322. Paris, December, 1919.

The best method for transporting milk for long distances is as follows:—Freeze $\frac{1}{4}$ of the volume of the milk in blocks weighing from 10 to 25 kg.; place one of these blocks in each milk can, then fill with pasteurized milk cooled at 4°C. Milk treated in this way can be kept safely for 2 or 3 weeks and be transported to any distance.

It should not be forgotten, however, that while cold reduces the growing power of microbes, it does not completely destroy their faculty of secreting specific enzymes, and thus, from the hygienic point of view, cold can only be counted upon for preserving sound milk.

PLANT DISEASES

469.—Dry Treatment With Copper Carbonate for the Prevention of Wheat Smut.—DARNELL-SMITH, G. P., and ROSS, H., in *The Agricultural Gazette of New South Wales*, Vol. XXX, Part 10, pp. 685-692, 7 Figs. Sydney, 1919.

Years ago, laboratory and field experiments have led the authors to the conclusion that the copper sulphate solution in which wheat seeds are immersed in order to prevent smut from appearing is clearly injurious, not only to grains that are split or otherwise damaged, but also to healthy seeds, by retarding and, in certain cases even, preventing germination.

After the seed had been treated with the copper sulphate solution, the advice used to be given to immerse it again in lime water made from freshly burnt lime, so as to neutralise the acidity of the copper sulphate. As regards this, the authors think that, apart from the corrosive action of the copper sulphate, simply immersing the wheat in water is more or less harmful to the future plant. For example, if a bushel of wheat is immersed in water for 3 minutes, it requires 8-12 hours to dry. During this period, partial germination takes place and, if the grain is not sown at once in damp ground so that germination may continue, the swollen grains are stopped germinating and, when a second germination takes place some weeks later, when the conditions are again favourable, growth cannot be as healthy and vigorous as if the grains had not begun to germinate once before.

With the object of eliminating the use of water, and of finding a less harmful fungicide than copper sulphate, the authors have carried out many experiments of recent years and have been led to prefer copper carbonate to all the different dusting powders or gases that have been tried. Copper car-

determine what factors have a direct bearing on net incomes. The influence of such studies should be to induce the farmer, whose farm is not producing profitably, to adopt those practices which will increase his income. This work has had a tendency to raise the average production and take care of the increase in population.

Increasing the Nation's Food Supply

The situation in relation to the food supply has been not so much economic as nutritional, that is, it has been a question of systems of production to feed the people rather than systems arranged purely for the sake of gain. No more effective work can be continued than the presentation of facts calling attention to the relative value of foods produced on an acre, with suggestions in farm practice that will increase profitably, if possible, those products of greater nutritional value.

Relation of the Labour Supply to Food Production. In view of the depletion of the country's food supply and the possibility of a continued demand for increased crop production, farm management men should devote special attention to methods of adjusting the farm plan to give maximum production with the greatest efficiency in the use of labour and machinery. The scarcity of skilled labour has been the principal limiting factor in production, and this factor will check the intensity of farming. The use of tractors in ploughing and the preparation of soil for sowing may enable the farmer to get his crops planted at the proper time, though possibly this may not be much of a factor in reducing costs. A saving of man power will likewise result from using four, six or more horses with larger machinery. Any line of work that will demonstrate how production may be maintained with less manual labour is most important at this time, otherwise there is great danger of land which might be used for wheat or other food crops being seeded down and a more extensive type of farming adopted.

It is essential to have information concerning the amount of labour required for farm operations and its distribution. These data are fundamental in working out cropping systems, particularly in determining when and how much labour is required for each month in the season. It will show in advance what regular labour is necessary, and indicate when extra help is needed. If it is impossible to obtain extra help at these times, it may be possible to introduce some labour-saving machinery or the farmer may co-operate with neighbours in exchange for help. If this difficulty is anticipated and the amount of labour required for different operations is known, the difficulty may be obviated by readjusting the crop

acres and the introduction of supplementary crops, which will maintain a more uniform labour requirement. It is in the solution of problems such as these that farm management men can be most helpful.

The economy in conducting farm operations is also influenced by the location of farm buildings and the shape and arrangement of the fields. The arrangement of farm areas, making larger and more uniformly-sized fields which can be more easily handled in rotation, would simplify the handling of machinery, save much time, and reduce the cost of production. Such work would attract the attention of farmers and be appreciated by them.

Standards Needed in finding Cost of Production.—The importance of adopting, as far as possible, standards in methods and agreements as to the elements in production cost studies, has been demonstrated by the greatly increased interest in this subject due to price fixing. Many agencies have been at work on these studies during the past year and such results as have come to light vary greatly in method of presentation as well as the elements included in determining cost.

Sometimes, overhead or indirect costs are included, and at other times omitted, in spite of the fact that every farm must bear in labour cost alone a burden of indirect expense equal sometimes to one-third of the cost of all the labour performed. These same discrepancies exist as to other elements such as machine cost, supervision, building costs, etc.

Sometimes particular interests affecting the point of view, influence the interpretation of inter-relationships in production cost finding. One group insists that all feedable crops produced and fed should be charged to live stock at cost of production. On the other hand, many writers, including those of the experiment stations and the United States Department of Agriculture, believe that market value at the farm is the only safe practical and correct value to use. The subject of cost production presents greater difficulties in certain aspects than almost any other branch of accounting, because of the many interrelations between farm enterprises. For example, certain equipment is used in preparing the ground, cultivation and sometimes harvesting of more than one crop. When land is prepared for oats or wheat, the land is also prepared for clover and timothy which follows. Likewise, in some regions, clover and timothy is seeded at the last cultivation of maize. Maize, oats and wheat are sometimes combined with live stock production. The raising of pure-bred cattle and milk production are very closely related and the costs would be hard to separate were it not

buted, so that all the figures and information that can serve as a basis for the economic calculations necessary to guide the farmer can easily be obtained. In this type of account, no special calculations are made of the special profit and loss appertaining to the different branches of the farm.

Special accounts are opened for:—

- (1) the farm;
- (2) the exploitation of the forests (eventually);
- (3) the household;
- (4) private consumption;
- (5) provisions (eventually); and
- (6) other sources of revenue (eventually).

The accounts will be kept by the system of double entry.

Type B: Extended book-keeping.—This consists of the detailed calculations of the profit and loss (special accounts) appertaining to the different branches of farming economy, such as milk production, rearing young stock, pig breeding and, eventually, the different crops. The calculations are sufficiently detailed to show the production costs of the products sold and the transformation value of the products consumed on the farm. This type of book-keeping requires more detailed preliminary data than the former.

The lists and accounts that usually require to be made up are as follows:—

- (1) Inventory of the assets and liabilities at the beginning and end, respectively, of the financial year;
- (2) cash account; this also shows the state of credit;
- (3) accounts for the products and live-stock.
- (4) day-book showing the hours worked by the men;
- (5) inventory of dead-stock;
- (6) account showing the distribution of labour to the appropriate accounts; and
- (7) household expenses account.

Among these, the first three numbers are always essential, whilst the need for the others depends on the size of the farm, and the extent to which it is desired that the accounts should be kept. In a simpler form of book-keeping, however, the account for products and livestock can be replaced by a household account.

If, in addition to farming, some industry of greater or lesser extent is carried on, such as a saw-mill, flour mill, distillery, starch factory, etc., accounts should be added dealing with these special branches of the farm.

During 1918, special studies, based on abstracts of the accounts, were made on 15 properties only. The greatest difficulty met with was the lack of interest shown by the farmers for accounts carefully and suitably kept. The large farmers prefer to keep their accounts themselves, and according to the method with which they

are already familiar. The small farmers as a rule keep no accounts at all.

The reports given, do not, therefore, disclose the individual situation of the farmers, and the different farms are indicated by numbers and all the figures are recalculated with hectares as a basis.

356.—Farm Management Problems in the United States.—BILLINGS, G. A., in *Journal of Farm Economics*, Vol. I, No. 1, pp. 3-7. Lancaster, Pa., June, 1919.

The unusual demand for food products and the scarcity of farm labour since the war began, have given rise in the United States to conditions which demand greater concentration of effort on farm management problems. These problems affect the community, the state, and the country as a whole and are in a measure sociological, but since they bear a close relation to production and to the individual farm, the basic unit of production, they are of vital importance to the economic management of the farm.

There has been no period in the history of the United States when economic conditions have changed so rapidly, requiring the most careful thought concerning the organization of farms of different types to meet present day needs, and the changes which may take place after the war; the policy of price fixing of farm products and its bearing on profitable production as compared with the fundamental law of supply and demand the mobilization of farm labour to produce the supply of food needed; and many other important factors have combined to furnish entirely new problems.

The cost of producing milk in large dairy regions and the cost of producing wheat as the basis of fixing the minimum price of wheat to the farmers, illustrates the kind of information which has more recently been demanded. The request for such information shows conclusively that the results from the investigation of farm management problems by state and federal departments should be tabulated, summarized and held in readiness for such requests. Moreover, this information should be put into such shape that opportunities may be given to the farmer to obtain suggestions for adjusting his system of farming to meet these changing conditions.

During the last ten years farmers have adjusted their business to meet slight changes in economic conditions. The ratio between food production and the increase in population has been quite constant.

The work in farm management has been therefore mainly to study the organization of farms and the farm practice in agricultural regions, in order to discover the relationships between farm enterprises and to

wagons in hauling. The principal obstacles to its effective use are bad roads. A majority of the truck users still use horses for some road hauling and in most cases for hauling in fields and around buildings. About one-fourth of those reporting do custom hauling, receiving an average of \$174 per year for this work.

Three-fourths of the trucks reported on operated on all or part dirt roads. Wind, snow, etc., were found to prevent the use of trucks on an average of about eight weeks per year. It is estimated that each truck travels an average distance of 3,820 miles per year and is used 173 days per year. Depreciation is the largest item of expense. Pneumatic tires are preferred for trucks of less than 1 ton and solid tires for those over 1 ton.

The average cost of operation of the $\frac{1}{2}$ ton trucks was about 8 cts. per mile, of the $\frac{3}{4}$ ton about 13 cts., of the 1-ton about 12 cts., of the $1\frac{1}{4}$ and $1\frac{1}{2}$ ton about 19 cts., and of the 2-ton trucks about 20 cts. The average cost of hauling crops, including the value of the driver's time at 50 cts. an hour, was about 50 cts. per ton-mile with the $\frac{1}{2}$ ton trucks, 34 cts. with the $\frac{3}{4}$ ton, 26 cts. with the 1-ton, 24 cts. with the $1\frac{1}{4}$ and $1\frac{1}{2}$ ton, and 18 cts. with the 2-ton trucks.

About half of the farms had decreased the number of work stock by at least one head since acquiring a truck. Less than 1 farm in 10 had disposed of more than two head. Over half of the farms of more than 120 crop-acres also had a tractor. This only slightly decreased the number of work stock.

RURAL ECONOMICS

Agricultural Accounting Offices in Sweden.—

H. JUHLIN-DANFELT, in *International Review of the Science and Practice of Agriculture*, Year XI, No. 4, pp. 407-410. Rome, April, 1920.

Since the beginning of 1890, great efforts have been made to speed-up the development of small farms in Sweden, and, in this connection, attempts have been made to encourage the small farmers to keep accounts regularly, especially by giving premiums to those that do this. The money required has been furnished by the "Riksdag" which, since 1910, has voted an annual appropriation of \$3,750. This sum is distributed to societies for rural economics, or to accounting unions for use in this way, especially to subsidize accounting bureaux to help farmers to keep their books.

With the aid of this State subsidy, seven societies for rural economics and two accounting unions have established agricultural accounting offices. Of these, only the

accounting office of the province of Malmöhus has attained any wide activity, whilst, in the majority of the other provinces, the offices have not become important.

In 1916, the General Agricultural Society of Sweden, which had just been founded, established an "exploitation bureau," with the objects of aiding farmers to keep accounts, to draw conclusions from them that would be of assistance in managing the farm, and to give advice on questions of rural economics.

By leaving the scientific elaboration of the accounting material from the accounting bureaux to the director of the "exploitation bureau" of the agricultural society, continuity in all that sphere of activity has been obtained.

The provincial accounting offices are made use of mainly by the small farmers; generally speaking, only 25% of those making use of the offices have been farmers owning more than 175 acres, as this is the largest area for which the State subsidy towards accounting expenses can be claimed.

The proportion of proprietors and tenants among those using the offices is not known, but it would probably be the same as that found among the farmers in the country, about 16% of whom are tenants. On the other hand, the "exploitation bureau" of the agricultural society is made use of largely by farmers owning larger areas.

The income of these offices consists chiefly of subsidies from the State and from the agricultural society on which the office depends, together with small sums paid by members of the society or payments for accounts accredited by the office.

The State subsidy reaches a maximum equal to the sum allowed by the agricultural society and may not exceed \$3.75 per account. In addition, it can only be paid during the first four years in which the farmer has recourse to the bureau for help. The upkeep of the "exploitation bureau" of the agricultural society is assured solely by the contributions of farmers who come to it for assistance.

Most of the offices have no other expenses save the salaries paid to the persons who administer them, and the salaries usually consist of a small fixed sum plus contributions from the clients.

Two main types of accounting are in use:—

Type A: Simple book-keeping.—This is intended to give a general view of the economic condition of the farm. The gross return, the cost of working, and the net yield of all the farming economy are calculated; the income and expenses are distributed among the various branches of the farm, the commercial movement between these branches is ascertained and, if required, the cost of labour is appropriately distrib-

¹See "Bulletin of Foreign Agricultural Intelligence," March, 1913, p. 23.

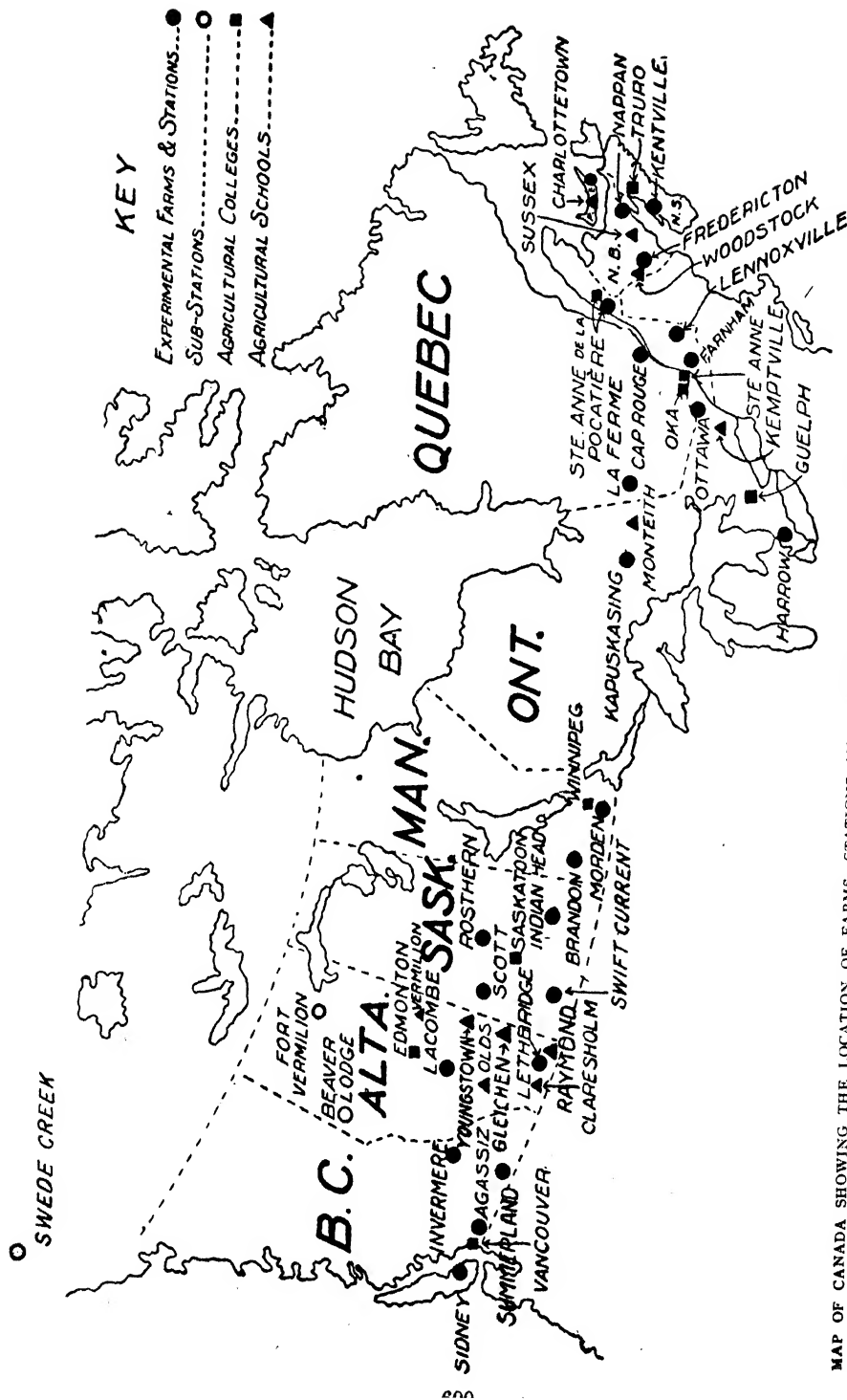
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The AGRICULTURAL GAZETTE

OF CANADA

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MAP OF CANADA SHOWING THE LOCATION OF FARMS, STATIONS AND SUB-STATIONS IN THE EXPERIMENTAL FARMS SYSTEM, THE AGRICULTURAL COLLEGES AND AGRICULTURAL SCHOOLS

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J. B. SPENCER, B.S.A., Director of Publicity.

REPORT OF THE ROYAL COMMISSION ON THE IMPORTATION OF STORE CATTLE INTO THE UNITED KINGDOM

ON May 11, 1921, His Majesty, King George V, appointed a Commission to inquire into the admission into the United Kingdom of live stock for purposes other than immediate slaughter at the ports. The Commissioners were Robert Bannatyne, Viscount Finlay (chairman); George Ranken, Baron Askwith, Sir Algernon Freeman Firth, Sir Arthur Everett Shipley, and Sir William Henry Peat.

The terms of reference were as follows:—

“To inquire into the admission into the United Kingdom of live stock for purposes other than immediate slaughter at the ports; whether such admission would increase and cheapen the meat supply of the country, and, if so, to what extent; and whether such admission is advisable, having regard to the necessity of protecting live stock bred in the country from the introduction of disease and of restoring their numbers after the losses to which they have been subjected during or since the war.”

The Inquiry

The sittings, 25 in number, began on May 30, 1921, and continued until July 6. Altogether 92 witnesses were examined. These included two ex-Ministers of Agriculture for the United Kingdom, Lord Chaplin and Lord Ernle. The Hon. S. F. Tolmie, Minister of Agriculture for the Dominion of Canada, and the Hon. Duncan Marshall, who was then Minister of Agriculture for the Province of Alberta, also gave evidence. The other witnesses consisted of Officials, English Farmers, Scottish Farmers, Irish Farmers, Representatives of the Irish Cattle Trade, the Meat Trade, Local Authorities, Free Importation of Canadian Cattle Association of Great Britain, and others.

Omitting the Historical Review and certain other preliminary material, the Report is published in its entirety, as follows:—

Scope of Reference

The inquiry which we are directed to make is as to the admission into the United Kingdom of live stock for purposes other than immediate slaughter at the ports. In terms this might include an inquiry as to the admission of live stock of any description, including cattle, sheep and pigs coming from any part of the world. We propose to confine our Report to the subject of the admission of cattle coming from Canada. The prohibition, the history of which we have given in brief outline, has been the subject of controversy almost exclusively with reference to cattle. Sheep and pigs have hardly entered into the discussion, and we have no evidence before us which would justify any finding with regard to either of them. The Secretary to the Commission received, it is true, but after the close of the evidence and addresses of Counsel, a letter dated the 7th July of this year from H.E. the Danish Minister, enclosing for our consideration a memorandum on behalf of the Icelandic Government on the question of the admission into the United Kingdom of Icelandic sheep as stores. The memorandum stated that there had been no foot and mouth disease in Iceland for 40 years, and that for the purpose of protecting the live stock of Iceland, all importation of live sheep and other domestic animals into Iceland is prohibited. According to the memorandum it was estimated that if admission should be conceded, at least 50,000 store sheep would, in a few years, be available annually for British markets. In view, however, of the paucity of evidence on the subject of Icelandic sheep we think that it would not be right, on the present occasion, to include them in this inquiry.

It is clear that the cattle referred to in the terms of reference must be cattle suitable for food as commonly used in this country, and that horses do not fall within its terms.

Further, the inquiry for all practical purposes must relate to cattle coming from Canada. It is with regard to Canadian cattle that the question has arisen, and it is to Canadian cattle that the evidence has been directed. The prohibition against importation, except for immediate slaughter, applies to cattle coming to the United Kingdom from any part of the world, and no case for exemption from it has been put forward except on behalf of Canada. It was urged by way of objection to the Canadian application that it would be impossible, in practice, to discriminate and that diplomatic difficulties might arise with foreign countries if Canadian stores alone were admitted. We do not think that this objection is of weight. Canada is an integral part of the British Empire, and if Canada makes out a case for admission, no complaint could be made by a foreign country that it would be unfair to admit the cattle of Canada alone. Considerations of a similar kind would apply as regard parts of the Empire other than Canada if any of them were to claim that admission should be granted to their cattle. No such claim has, so far, been made except on behalf of Canada and no such claim seems probable, but if it were made it would have to be determined according to the circumstances of each case.

With regard to Canada, it has been suggested, as an objection to the admission of Canadian stores, that it is inadvisable that we should become dependent for the supply of store cattle on a source which might be cut off in time of war. The possibility of the supply of stores from Canada being barred in time of war, owing to the difficulty of transit across the Atlantic, may be relevant on the question of the policy of their admission, but we do not think that the terms of reference are such as to bring within our competence a question of broad Imperial policy of this description.

A great deal has been made in argument of pledges alleged to have been given by the Government to Canada that the embargo would be withdrawn. Evidence with reference to such pledges could not be excluded, for it might well be said that if the Government did give a pledge of this kind it would be some evidence that the thing itself was proper to be done. Our Commission, however, is to inquire on the terms of the reference whether it is a thing proper to be done, and we are bound to inquire and report on this point. We are not appointed to inquire whether the Government had pledged themselves to any particular course of action, but whether admission is advisable on the lines indicated in the reference.

It was strongly urged before us that the admission of Canadian stores would very much shake the confidence of home breeders in Great Britain and Ireland, and lead to the curtailment of breeding in the United Kingdom, so that in the long run, at all events, the admission would not be in the interests of this country. It was apprehended that confidence would be shaken in two ways: first, it was said that the apprehension of disease from the admission of Canadian stores was widely entertained; and secondly, it was said that there was a great dread of Canadian competition among home-breeders. With regard to the former of these two grounds, we shall deal with it in detail further on. With regard to the second, we desire to make the following observations. It was not contended in terms that the home-breeders should be protected against the competition of Canadian cattle, or that such protection was necessary for the breeding industry in England and Wales. Indeed, we do not read the terms of reference as requiring us to report upon a question of this nature. No evidence was adduced to show that such protection is necessary, but there was a great deal of evidence tending to show that apprehension on this subject

is widely entertained in England, and that therefore the admission of Canadian cattle might have a prejudicial effect, by discouraging the breeding industry here, so that the apprehension might, in this way, tend to bring about its own fulfilment. If there be such a widespread feeling among English farmers as to the effect on home breeding of the admission of stores from Canada, its existence may have a great bearing upon the policy of putting an end to the embargo. For this reason, we think that the question how the proposed admission is regarded by the farmers cannot be ignored.

The question whether Canadian stores should be admitted is one on which there is great difference of view in the different parts of the United Kingdom and among different classes of the population. The considerations applicable to the various parts of the United Kingdom and to the various classes of the population are very different.

In England the balance of opinion among the farmers appears to be strongly against the admission. Resolutions were passed by all the branches of the National Farmers' Union, with the exception of the Northumberland branch, in favour of the maintenance of the embargo. It was, indeed, suggested that there are large minorities of the other way of thinking, but little evidence was forthcoming to this effect.

Opinion in London, and in the towns generally, appears to be in favour of admission, and to be based on the expectation that this would bring down the price of meat, and especially of fresh meat, very materially.

In Scotland the large towns also advocate the admission of Canadian stores, and the great majority of the farmers in Scotland, as a rule, take the same side. There is a great deal of high farming of an intensive character in Scotland and most of the Scottish farmers regard the feeding of cattle as

a necessary element in good farming, as they consume the root-crops, etc., and supply most valuable manure. A different feeling, however, prevails among the smaller farmers of the Highlands as they regard with great apprehension the competition of stores from Canada with stores bred on their own farms, on the sale of which their profits largely depend.

In Ireland the feeling is unanimous in favour of the maintenance of the embargo. The farmers there believe that its removal would be disastrous to them and might oust them from the market for their stores, of which they have now had the exclusive enjoyment for a great many years. We do not think that it is within our province to decide how far these apprehensions are well-founded, or to consider what might be the effect, from a political point of view, of such a change.

A good deal was said in evidence from Ireland as to the possible danger to the United Kingdom if the Irish farmers, on whom Great Britain has relied for stores, were driven out of this business by Canadian competition. It was said that, in time of war, stores could not be brought across the Atlantic; to this point we have already adverted. A similar difficulty might arise in the case of an outbreak of disease in Canada.

Other considerations of a political nature may arise with regard to Ireland. Ireland is, at present, an integral part of the United Kingdom, and the control of cattle in Ireland rests with the Irish Department of Agriculture, which is answerable to the Imperial Parliament and is represented there. The possibility that this state of things may cease has been touched upon in argument, but we think it is not for us to deal with such a question. For the purpose of this report, we must assume that Ireland will remain, as regards the control of the Irish Department of Agriculture, an integral part of the United Kingdom.

In framing our report we have had regard to the questions actually put to us, which are questions of fact and the answers to which must depend upon the evidence.

Effect on Meat Supply

Though no definite figure can be laid down with precision, it has been estimated that Canada would be able to ship 200,000 head of cattle annually for fattening in the United Kingdom, and that this amount might rise to something approaching half a million. For the purpose of estimating the effect of admission, 200,000 was generally taken by the witnesses as the probable supply, and we propose to deal with the question upon this basis.

It is extremely difficult to determine how far this amount would form an addition to the meat supply of the United Kingdom. To some extent it might merely replace stores raised in Great Britain or in Ireland. Assuming, however, that the 200,000 would constitute an addition of that amount to our meat supply, it must be borne in mind that this would be an increase of only 8 per cent relatively to the whole meat supply. Two and a half million beasts are, we are informed, slaughtered in this country every year, for the purposes of the meat market.

Sir Daniel Hall, the chief scientific official at the Ministry of Agriculture in London, stated that it is the price of chilled beef which, under normal circumstances, mainly determines the price of home-bred beef (1st day, Q. 83). Mr. Robbins, the President of the National Farmers' Union, said that even if the Canadian surplus of 200,000 could be diverted to this country at a cost substantially less than that of home-bred stores, he did not think that such an addition would affect very appreciably the price of our total supplies (3rd day, below Q. 1022). There were other witnesses who took the same view. On the

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other hand, Mr. W. Smith, Convenor of the County of Forfar, who has dealt largely in cattle, said that Canadian stores would increase and cheapen the meat supply, though he could not say to what extent, as that would depend upon the prosperity of the country and the numbers that were sent (9th day, below Q. 4220); and evidence to the same effect was given by Mr. W. Maxwell, farmer and wholesale potato merchant in Forfar (10th day, below Q. 4492). It may be said of the Scottish witnesses in general that, however keen they were for the admission of Canadian stores, they refused to commit themselves to any figures with regard to the decrease in the price of beef to be hoped for as one result of their admission. Mr. J. B. Guild, a Fellow of the Royal Statistical Society and the Economic Society, said (17th day, Qq. 8527-8529) that if there were a large importation of stores, say, 200,000, there would be a temporary reduction in the price, owing to the alarm of English breeders, who would put their stores on the market, but that he did not think there would be a permanent reduction in price. In answer to questions put by Lord Askwith (18th day, Qq. 8779-8780) whether there were any data on which the temporary cheapening could be computed, he said that it was a matter of pure guess.

On the other hand, there were some estimates of the amount of reduction of price to be expected which appear to us to be quite extravagant. During the last election at Dudley, a statement was circulated that the admission of Canadian stores would reduce prices of beef by 6d. per lb., and this figure was supported by some witnesses called before us in favour of admission; we are quite unable to accept it.

Dr. Tolmie, the Minister of Agriculture for Canada, in his very clear and able statement of the reasons for the removal of the embargo (19th day, Qq. 9246-9666), laid no stress upon any re-

duction in the price of beef to the consumer.

We have also had the evidence of Lord Ernle on this point. He said (21st day, below Q. 10,697): "I do not myself believe that the importation would necessarily increase the supply or cheapen the cost of fresh meat." He added: "Even if the importation of Canadian cattle did increase supply and cheapen cost of fresh meat for a time, it would only do so for a limited period."

Upon the whole, we think it probable that the admission of Canadian stores would cause a slight reduction in the price of beef.

As to the extent of the reduction, it has been stated in evidence by Mr. W. H. Key, a witness representing the view that the embargo on cattle should be removed, that, from his experience as a wholesale meat salesman, an increase of 5 per cent in the supply in the market almost invariably resulted in a decrease of 10 per cent in the price (20th day, Qq. 10,367-10,370). If this canon were accepted, it would mean that an increase of 8 per cent in the supply would be followed by a reduction of 16 per cent in the price. We were unable to obtain data justifying this calculation. Mr. Key merely stated that he had found it so in his experience. We cannot accept the standard suggested as invariable. It is clear that an increase in the supply must have some economic effect upon the price. We cannot, however, indicate with any certainty the extent of that economic effect, because so many factors may arise to affect the result. Assuming that the demand remains constant, any temporary reduction or increase in the supply must, under normal circumstances, influence the price, and there is no doubt that the supply would, in course of time, adjust itself to the demand, and thus the reduction or increase in price, due to the excess of supply, or *vice versa*, would soon disappear. We are of opinion that the competition resulting from imported

stores, and the fact that a more regular supply would be available to the feeders in consequence of there being two sources of supply instead of one, would result in stores being procurable at a lower level of prices, and that this would, in course of time, be reflected in the retail price of fresh meat and bring down the price to a generally lower level. We discard speculations as to any immediate and temporary effect which the admission might have in bringing down prices. We think it quite possible that if a drop in price were caused by any nervousness in the market on the first admission of Canadian cattle, such a drop might be followed by a reaction in the direction of higher prices. We should, however, anticipate that ultimately, with Canadian stores coming in, prices would settle down on a level somewhat, but not greatly, lower than that which would prevail under the embargo.

Effect of Admission

The second question for our consideration is "Whether such admission is advisable, having regard to the necessity of protecting live stock bred in the country from the introduction of disease, and of restoring their numbers after the losses to which they have been subjected during or since the War."

The question is whether admission is advisable. We do not read this question as confining the grounds for admission to an increase and cheapening of the meat supply, but as intended to embrace any grounds connected with the production of food. We think that the terms of reference should be read liberally, so as not to exclude from the inquiry a matter which is highly relevant in itself and to which a good deal of evidence has been directed.

Sir Robert Greig, giving evidence on behalf of the Scottish Board of Agriculture, summed up in a few sentences the grounds for the admission of Cana-

dian stores which he advocated: (2nd day, Qq. 428-432).

"(Q.) Taking the matter as a whole, and summing up what you have said, and the result of the consideration which your Board have given it, what do you say on the subject of the propriety of an augmented supply of store cattle, and its effect on the production of food and arable farming?—(A.) My Board's view is that an augmented supply of store cattle would increase the production of food both directly and indirectly, and would be to the advantage of arable farming and the consumers of the country as a whole. On the other hand, my Board is of the view that it would be to the disadvantage of the small farmer, that it would decrease his income, and that it might conceivably put a certain number of these farmers out of business; but the balance of advantage, in the opinion of my Board, is in favour of the importation of store cattle.

"(Q.) That is leaving out of account the question of disease?—(A.) Yes.

"(Q.) You have already referred, I think, to the necessity of larger supplies of store cattle for the grain and potato growing farms?—(A.) Yes.

"(Q.) As you have just said, steps would be desirable to stimulate the breeding of greater numbers of store stock in Scotland if the embargo is to continue?—(A.) I believe that to be absolutely essential if we are to maintain or increase the arable acreage. My view is that the arable farmer, if he sees in front of him an increased supply of store cattle, will increase his arable acreage.

"(Q.) Is the area of arable acreage in danger of declining under existing conditions?—(A.) The arable acreage is rapidly declining, I regret to say, and has been declining for many years."

This passage fairly represents the effect of a good deal of other evidence.

For intensive farming, such as prevails in Scotland, and in many parts of England, a sufficient supply of stores is essential, and it is for this reason that the importation of Canadian stores is desired so keenly by most Scottish farmers. For this purpose we think that the admission of Canadian stores is in itself desirable. It would appear that the number of cattle in Great Britain during the last 30 years has not increased in the same ratio as the population, but that on the contrary there has been a large relative decrease.

Alleged Danger of Disease

But, whatever the advantages of importation, the idea could not be entertained if there were danger of disease being brought thereby into the United Kingdom.

Is there any such danger?

The diseases of cattle most to be dreaded are Cattle Plague, Pleuro-pneumonia and Foot-and-Mouth Disease. It was on account of the supposed presence of Pleuro-pneumonia in certain Canadian cattle in 1892 that permission to import, except for slaughter at the port of landing, was first withdrawn for cattle coming from Canada. We have had a good deal of evidence with regard to those particular cattle, and there seems to be every reason to believe that they were not suffering from Pleuro-pneumonia at all, but from some other affection of the lungs with somewhat similar symptoms, which was mistaken for the deadly and dangerous Pleuro-pneumonia.

It is further, in our opinion, established that for the last thirty years, no Cattle Plague, Pleuro-pneumonia or Foot-and-Mouth disease has existed in Canada, and, indeed, there is no trace of any of them having appeared at any time in that country except in 1884, when two consignments from Great Britain were found to be affected with

Foot-and-Mouth disease, both of which were dealt with at a quarantine station at Quebec, and the disease did not obtain a footing in Canada (19th day, 9th para. under Q. 9248). At present, Great Britain draws largely upon Ireland for stores, and Lord Ernle, although he gave his opinion against the admission of Canadian stores, said he considered the Canadian cattle healthier than the Irish (21st day, Q. 10,743).

We have had a great deal of evidence as to the health of the Canadian cattle, and in our opinion it established that they are healthier than the Irish, and indeed than the British. It has been repeatedly admitted by Your Majesty's Ministers that there is nothing to fear from disease among the Canadian cattle themselves.

It has, however, been urged by the advocates for exclusion that there is disease among cattle in the United States, and that the frontier is a very long one, so that diseased cattle might find their way across. But the Canadian frontier has been so guarded and policed that there has been no case of any such disease finding its way into Canada from the United States for the last thirty years, and, there is no record of anything of the kind at any time. The Canadian Government state that they are ready to adopt any additional precautions that can be suggested and, in our opinion, there is no appreciable risk of disease being set up in the stock of the United Kingdom by permitting the importation of Canadian cattle.

Canadian cattle are all branded with distinctive marks, and with ordinary care there seems to be little chance of United States cattle being sent to this country as Canadian cattle.

Quarantine

It was said by witnesses opposed to the admission of Canadian cattle that if they were admitted they should be subjected to a period of quarantine. It

appears clear, from Sir Daniel Hall's evidence (1st day, Q. 62), that a system of quarantine, in the first place, would be extremely expensive, and, in the second place, would so hamper the trade as to render the permission to import illusory. Sir Daniel Hall stated that "it would be absolutely impossible to continue to carry on a trade on a basis of quarantine." (Q. 62.) This is confirmed by Dr. Tolmie, the Canadian Minister of Agriculture. He was asked (19th day, Q. 9577) by Lord Askwith the following question:—

"I understood you do not want quarantine between this country and Canada if these cattle were brought in here?"

to which he replied:—

"It would make the store cattle business an impossibility."

We have given a great deal of consideration to this point, and it appears to us that quarantine in the case of Canadian cattle is unnecessary. The cattle are very healthy, and every precaution would be taken by the Canadian Government, as Dr. Tolmie stated, for thorough inspection before and during their transport to England. The sea voyage by itself could be rendered by suitable inspection equivalent to a period of quarantine. The Canadian Government have undertaken, through Dr. Tolmie, that the traffic will be confined to cattle born and bred in Canada, and that every possible precaution will be taken against the transport of diseased animals. It is obvious that if Canadian cattle are admitted, it would be highly in the interests of Canada herself to take care that all regulations for this purpose should be fully observed.

Lord Ernle's Evidence

Lord Ernle, after referring at some length to what took place at the Conference in April, 1917, gave his view of the present situation, and pronounced against the admission of Canadian stores (21st day, 8th para. under Q. 10,697).

"If any substantial and clear advantage to the community could arise from the admission of Canadian stores, I should, personally, be willing to face whatever risk, if any, remained after taking all possible precautions. But the real question is, what the farmer would think. His capital is not large, and he has no margin outside what is invested in his business. He is necessarily cautious. Unless he has confidence he will not rear stock. That is, I think, a certainty. I do not believe that any man would venture to say that it is absolutely free from all risk to allow the importation of Canadian stores. It is at the highest a question of degree. I think the importance of that is this: The Government, in 1896, decided that safety, absolute safety, was secured by the prohibition of all stores, and I do not think the maintenance of that view can be regarded as a stigma on Canadian cattle, provided that we remove the imputation, which I think we may very well do, that they were excluded, because we were not reasonably satisfied that we were secure from risk. I think we might, and we ought to put it upon absolute safety, and, if I may venture to say so, I do not think that any country allows cattle to enter its ports or cross its frontiers in the wholesale fashion in which Canadian stores would have to enter this country; that is to say, they all impose severe tests, even on pedigree breeding cattle."

With most unfeigned respect for Lord Ernle, we are unable to concur with him upon this point. He says: "the real question is what the farmer would think." This passage strikes the keynote of the opposition, so far as England is concerned, to the removal of the embargo. The true question seems to us to be what the facts really are, while we fully recognize that what the farmers think may be a reason for some delay in taking action if Your Majesty's

Government think that this is desirable.

So far as these apprehensions rest upon belief in the danger of infection, they are in our opinion unfounded. So far as they depend on the dread of competition with stores bred in this country, we may point out that the cost attending transport of Canadian cattle from the West of Canada to this country must always be heavy,* and of itself necessarily have a considerable protective effect in favour of the home breeder, and we do not consider that the propriety of continuing the prohibition for the purpose of ensuring complete protection against competition falls within the terms of our reference.

Importance of Home Breeding

The home breeding of stores should certainly be encouraged, and no prospect of immediate advantage should lead this country into any course which, by diminishing or destroying the breeding industry here, would render it absolutely dependent upon overseas sources. It would be quite as much to the advantage of this country that it should be able to rear within its boundaries all the cattle required for the food of the population and for the efficient conduct of agriculture as that it should be able itself to grow all the corn required here for food. The advantage of this in time of war has been brought home to every one by the experience of the last few years. It is, however, clear that Great Britain (England and Scotland and Wales) cannot, under present circumstances, produce all the cattle wanted for the most effective tillage of the land and for food, and at present Great Britain to a great extent depends for the neces-

sary supply of stores upon Ireland. So long as Ireland remains an integral part of the United Kingdom, the Irish Department of Agriculture is under the control of the Imperial Parliament and Government, and supplies from Ireland may, for this purpose, be treated as if produced in Great Britain. The supply of stores from Ireland was not interrupted during the war. But the Atlantic separates Great Britain from Canada, and it is possible that the supply of stores from that source would be impracticable in time of war. It has been urged by those who are against the admission of Canadian stores that if they were admitted they might drive Irish stores out of the market, and that Irish farmers might turn their attention to the production of fat cattle instead of stores, so that we should become entirely dependent on Canada for stores, which might fail us in time of war. It must, however, be a matter of uncertainty whether the competition of Canadian cattle would have this effect upon the Irish trade in stores.

We may point out that considerable inconvenience has recently been caused by the failure of stores from Ireland, owing to outbreaks of foot-and-mouth disease there, and it would obviously be of great advantage that there should be another source of supply for Great Britain. In this connection it was pointed out by the advocates of admission that if a trade in Canadian stores with this country should be developed, the Canadians would have every motive to improve the quality of their cattle, and for this purpose would naturally come to the United Kingdom for the purchase of pedigree bulls, in the supply of which the United Kingdom is admittedly foremost, and so this very important branch of agricultural industry might be substantially enlarged by the increased demand from Canada.

* See the evidence of Sir Daniel Hall (1st Day, Q. 119); of Prof. Wallace (2nd Day, Q. 641); of Dr. Tolmie (19th Day, above Q. 9,251); of Lord Ernle (21st Day, Qq. 10,936-10,937), and of Mr. P. E. Light (20th Day, Qq. 10,191-10,261; 21st Day, Qq. 10,945-10,961).

Highlands

In the Highlands there are some features which deserve special consideration, as bearing on the effect which the admission of Canadian cattle might have upon the crofters and small farmers.

We desire to refer on this subject to the letter of the 23rd June, 1921, sent by the Marquess of Graham, as President of the Highland Cattle Society of Scotland, and set out in the evidence of the 19th day (immediately above Q. 9246), the material part of which is as follows:—

“As President of the Highland Cattle Society of Scotland, I am desired to communicate with you on the above subject, and to say that the general opinion of our members appears to be against the importation of live cattle from abroad. Our members are of opinion that it is desirable to encourage by every means the breeding of stores in the Highlands and Islands from our native breeds and crossed with healthy stock suitable for low ground grazing. We are of opinion that imported cattle from Canada or elsewhere would be quite useless for grazing in the Highlands, and that any measures which discourage the raising of home stores would seriously prejudice the living and agricultural interests of the crofters and other small farmers of Scotland.”

We also call attention to the following resolution which we are informed has been adopted by more than 100 Crofters and Small Farmers' Associations in Scotland:—

“We, the members of the ‘(society named)’ representing the interests of all the crofters and small holders in the district, emphatically protest against the removal of the present restrictions on the importation of cattle from abroad. We are totally dependent on our crofts, and the chief source of our income is from

the sale of our young cattle, which are sold as stores to the big arable farmers in the Lowland counties. If the restrictions on the importation are removed our chief means of livelihood would be seriously endangered.”

This resolution was quoted in a statement in writing made by Mr. C. M. Bruce, of Forres. He was prevented by illness from attending before us, and the Commission accepted this statement as his evidence. The following passage may be cited from it:—

“All whom I have consulted are unanimous in support of the embargo remaining, otherwise they view the future with grave misgiving. In several instances I was told that heifers they had kept for breeding cows, had not been served this year, but would be sold in the autumn to the feeders. When I asked them not to despair they pointed out that they had no organization to speak for them while the wealthy feeders of the Lowlands, the meat traders and others were well represented. I found that even the suggestion of any change caused something approaching a panic. They asked since there were so many ex-service men among them would this have no influence in their favour. Down towards the Lowlands the crofter and small farmer has more strings to his bow. His mode of farming is different and he being nearer the markets can trust more to the side products for part of his living. Here also the dread of being knocked out by Canadian competition is general. They all depend on the calves paying the rent and manure bills, while the other products keep the home. They could not carry on without the profits obtained from calf rearing.”

Reference may further be made to the evidence of Mr. W. R. Ross tending to show that the admission of Canadian cattle would be to the Highlands

a calamity (8th day, Q. 3579), and to the evidence of Mr. Macnaughton, who, speaking from a wide acquaintance with the central Highlands, said that the admission would throw much of the land there out of cultivation (8th day, Q. 3626). On the 8th day, at Q. 3478, will be found the evidence of Mr. D. McLaren, who spoke of the serious consequences which admission would have upon the large district between Dunblane and Oban, in which he said the opinion was unanimously against admission. Mr. James McTaggart, of Oban, member of a firm of large cattle salesmen in the West of Scotland, who spoke for the smaller class of crofters and farmers in the West Highlands and Islands, gave evidence as to the improvement that had been effected in cattle breeding in the West Highlands, and as to the disastrous effects which, in his opinion, would follow on the admission of Canadian stores. (16th day, Q. 8162.)

Sir Robert Greig, while he thought the admission of Canadian stores would, on the whole, be for the benefit of agriculture in Scotland, said that in some instances their admission might bear hardly upon farmers. On the 2nd day (Q. 407) he said:—

“If the Canadian or any other store were imported in very large numbers, it is quite conceivable that some of those up-land farmers, in fact it is certain that some of those up-land farmers would find their profit reduced, and it is even conceivable that in some instances some of those up-land farmers would go out of business or would go in for some other kind of farming and refrain from breeding store stock.

“(Q.) Do you mean they would devote the land to sheep?—(A.) I say it is conceivable. Personally, I take the view that very little of that would happen, but it is arguable that the price might fall to such a level that

certain store farms would go out of cultivation, or at least would go out of the business of producing store cattle.”

While he thought that the danger of diminution in the production of store cattle in Scotland, from the importation of store cattle from abroad, is not very grave, he added (Q. 410):—

“I think that some farmers, situated in difficult circumstances who are just able to make ends meet when the price of store cattle is high, might have the balance set against them and be thrown out of business.”

He summed up his evidence on this point as follows (Q. 415):—

“I consider that balancing one advantage with another, taking into account the disadvantage to the up-land farmer and the possibility that the introduction of store cattle will discourage the up-land farmer to some extent in his business of breeding stores, still, the balance of advantage to Scottish agriculture is in its favour; the balance, when you regard the increased production of food, is still more in its favour; and the balance to the consumer is even further, I think, in its favour.”

Upon the whole, we think there is reasonable ground for apprehending that the admission of Canadian stores might have a prejudicial effect upon the welfare of the crofters and small farmers in the high-lying grounds in the Highlands.

Ireland

There appears to be no division of opinion in Ireland on this subject. All parts of Ireland are agreed in thinking that Canadian stores should be excluded from the British market. Indeed, it is obvious that if Irish stores now sent to Great Britain were replaced to any great extent by Canadian stores, it might have a serious effect on Ireland, except so far as it might lead to the substitution of the sale of fat cattle for the sale of stores.

Restoration of Herds

With regard to the subject of the restoration of the number of our home herds mentioned in the latter part of the second question in our terms of reference, it is, we think, established that our herds in the main kept up their numbers in spite of the war, and that the diminution which took place latterly was due to the excessive slaughter of calves, resulting principally from the great demand for veal and the high price of milk. We see no reason to think that this excessive slaughter of calves will continue.

Sir Daniel Hall, in his evidence (1st day, Qq. 70-75, 139-140, 189-190), expressed great apprehension as to the effect of the want of confidence which he thought might be created in English farmers by the admission of Canadian stores. He thought that this might lead them, instead of rearing their calves, to sell them to the butcher. Any opinion expressed by Sir Daniel Hall is, of course, entitled to the most respectful consideration, but we cannot help thinking that the apprehensions entertained by him on this point are somewhat exaggerated. We cannot think that the farmers of England would regard the admission of Canadian cattle as a signal that they must give up the endeavour to carry on their business as hitherto.

We have already dealt with the question of confidence on the part of the English farmers, and we venture to anticipate that the restoration of the numbers of the herds will go on. In our opinion, the importation of Canadian cattle would not interfere with the restoration, on the contrary, we think it would probably help the restoration by bringing a larger supply of healthy cattle within the reach of farmers. The contrary view rests on the assumption that the farmer, in his dread of Canadian competition, might abandon breeding and rearing in despair.

Fluctuation in Supplies

A great deal was said in argument before us and by Mr. Robbins in giving evidence on behalf of the National Farmers' Union as to the risk that the supply of Canadian stores might fluctuate greatly in amount. We can find no solid ground for this apprehension. Of course, the rigour of the Canadian winter is to be reckoned with, but there is no reason to think that a supply sufficient to meet the demand would not be regularly forthcoming.

The grounds on which Mr. Robbins based his statement as to irregularity of Canadian supplies were three (3rd day, 8th para., below Q. 1022).

- (1) The competition in the market of the United States. Canada and the United States are contiguous, and the United States may in the future consider it to their interest to encourage instead of discouraging, as at the present moment, the importation of Canadian stores. It cannot, however, be assumed that there would be frequent changes in the policy of the United States in this matter. We do not think that the possibility of difficulty arising in the future from action by the United States with regard to Canadian stores is a sufficient reason for not taking any course which present circumstances may indicate as desirable.
- (2) The second ground for apprehending irregularity in Canadian supplies was based on the figures as to the number of live stock in Canada year by year, which Mr. Robbins says show wide fluctuations in comparison with those of the United Kingdom. This appears to be the case. A comparison of the figures shows that there has been greater fluctuation in the number of cattle in Canada than in the number of cattle in the United Kingdom. In the years

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1907-1910 (both inclusive), the numbers of cattle in Canada were respectively, 7,131,816, 7,547,582, 7,234,085 and 7,114,914. In 1911, the number dropped to 6,533,436. In 1912 it was 6,431,861, and in 1913 6,656,121. In 1914, the number dropped to 6,036,817, and in 1915 it was only slightly larger—6,066,001. In 1916, it rose to 6,594,151, and in 1917 to 7,920,940. In 1918 there was a considerable increase, the number being 10,045,867, in 1919 the number was 10,085,011, and in 1920 it was 9,477,380.

These numbers are not as steady as the numbers in the United Kingdom, but we can see nothing in them to justify the apprehension expressed that the supplies could not be regularly kept up.

Mr. Robbins contended that it had been found by experience that we can get regular supplies from Ireland, and that they were not likely to be so regular from Canada, but we do not think that he succeeded in making this good (3rd day, Qq. 1113-1125).

- (3) The third ground upon which Mr. Robbins thought the Canadian supplies would fluctuate is the fact that in Canada the conditions of transport favourable for this trade last only for a limited number of months each year. It is not easy to see why a breakdown of communication in Canada or over the Atlantic should be apprehended in the autumn, at which season the bulk of the Canadian stores would probably be shipped. There might, of course, be an occasional breakdown, but this is incidental to any long line of communication.

In one of the minority reports of the Inter-Departmental Committee on Meat Supplies (Cmd. 456, 1919) there will be

found, at page 27, a very clear summary of the reasons against the admission of Canadian stores. We have already dealt with all the grounds there urged for the exclusion of Canadian cattle. We desire now only to add that we can see no sufficient grounds for the conclusion stated in the paragraph last but one in that report.

"It appears to us, however, that if Canadian stores were re-admitted the numbers reaching this country would be small, uncertain and variable."

The evidence which was called before us seems to establish the contrary. We may refer especially to Dr. Tolmie's evidence given on the 19th day (under Q. 9250, "(d) Possible Supplies from Canada"), and we cannot regard as well-founded the fears expressed on this subject by Mr. Gill in his evidence on the 4th day ("Uncertainty of Canadian Supplies").

Lord Chaplin's Evidence

We desire to express our obligation to Lord Chaplin, for the statement which he gave us of the grounds for maintaining the prohibition against Canadian cattle, and for the evidence which he gave in answer to questions put to him upon this statement. With a great deal that Lord Chaplin said as to the evils of indiscriminate admission we are in agreement. We regret, however, that on the subject on which he speaks with such unique authority we feel unable upon this reference to accept his conclusions against the admission of Canadian cattle. We have endeavoured to give in detail our reasons for venturing to differ from Lord Chaplin upon this subject, confining ourselves to the terms of reference and not entering upon wider questions of policy on which his views may rest.

Milk

A good deal of evidence has been directed to the question of the effect which the importation of Canadian

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cattle might have upon the milk supply. It is impossible to overestimate the importance of milk as part of our food supply, and it would be a fatal objection to the admission of Canadian cattle if it were the case that the admission would have a bad effect on the supply of milk.

Sir Daniel Hall took the view that the importation of Canadian cattle might lead to excessive slaughter of calves and that consequently fewer heifers would be reared to become milch cows (1st day, Qq. 71, 72 and 171). We have already dealt with the question of possible slaughter of calves under the heading of "Restoration of Herds," and have given our reasons for venturing to differ from Sir Daniel Hall upon this point. We do not think that prejudice would be caused to the milk supply in this way.

Lord Astor, who appeared before us as a witness on this part of the case, had been Chairman of the Committee on Milk Production and Distribution (Cmd. 483 of 1919). He gave it as his view (15th day, Q. 7244) that only the best dairy cattle should be imported, and was apprehensive as to the effect which the introduction of Canadian cows and heifers might ultimately have on the milk of this country. Mr. Henderson, on the other hand, thought that Lord Astor's evidence showed a want of appreciation of the views of the practical farmer, who looks out for an animal suitable for milk production and beef production as well. (15th day, Q. 7791).

Sir Robert Greig, of the Board of Agriculture for Scotland, took the view that the removal of the embargo would give us more milk and cheaper milk (2nd day, Q. 514), and, having regard to the admittedly excellent health of the Canadian cattle, this seems to us to be a reasonable view. It is proved by a number of witnesses that the Canadian cow is less liable to tuberculosis than English or Irish cattle (see the evidence of Mr. Cochrane, 12th day, Q. 6290), and this

was borne out by the account given us by Alderman Hornby of the complete freedom from contagious disease in the Canadian cattle imported to Manchester between 1896 and 1911 inclusive (18th day, Q. 9170). Reference may also be made to the evidence of Mr. Chapman, representing the Live Stock Traders' Association. (13th day, Q. 6667).

The Liverpool and District Cowkeepers' Association whose members own about 7,000 head of cows, were represented by Mr. Foster (23rd day, Q. 11,504), who said that admission would make our milk supply purer.

Upon the whole, there is no reason for thinking that the importation of Canadian cows or heifers would affect our milk supply prejudicially; and, having regard to the healthiness of Canadian cattle, we think that an improvement might result.

CONCLUSIONS

The conclusions at which we have arrived are as follows:—

- (1) We are of opinion that the admission into the United Kingdom of Canadian cattle for purposes other than immediate slaughter at the ports, would tend to increase the meat supply of the country to some extent, but it must not be assumed that the increase in the meat supply would necessarily be equivalent to the whole number of cattle so admitted, as it is possible that some of them might merely replace stores raised in Great Britain or Ireland.
- (2) We think that such admission would tend to cheapen, in some measure, the meat supply of the country, but there are no data on which the extent can be accurately gauged. We think, in the long run, the tendency would be to bring prices to a level somewhat, but not greatly, lower than that

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which would prevail if the embargo were maintained.

- (3) We think that the importation of Canadian stores would tend to satisfy in some measure the increasing demand for fresh home-fed meat.
- (4) We are of opinion that such admission is advisable, as providing another source for supply of stores for the purpose of scientific agriculture, with a consequent increase of the food supply.
- (5) We are of opinion that there is no substantial ground for the apprehension that such admission would introduce disease among the cattle in this country.
- (6) We are of opinion that such admission would not interfere with, but would tend to promote the restoration, and, indeed, the increase of the numbers of live stock in this country after any losses sustained during or since the war.
- (7) We are of opinion that the introduction of Canadian cattle would not have any prejudicial effect upon the milk supply of this country, but would, on the contrary, tend to its advantage.
- (8) We find that there is a general feeling among English farmers against the admission of Canadian stores. So far as this is created by the apprehension that disease may be thereby introduced, we consider it unfounded. So far as it is based on the view that the prohibition should be kept up for the protection of the home breeding industry against competition, we do not think that the question of such a policy falls

under the terms of our reference. As we have pointed out, the cost of transport to England in itself forms a considerable measure of protection to the home breeder.

- (9) We are of opinion that the admission of Canadian stores might make it difficult for crofters and small farmers in the Highlands to carry on their farming operations successfully owing to competition with them in the market for the sale of stores.
- (10) We are of opinion that the admission of Canadian stores might to some extent deprive the Irish farmers of the market which they at present enjoy in Great Britain for their stores.
- (11) We have not thought it within the terms of reference to enter into questions of Imperial policy as regards the food supply of the country in time of war, protection of home industries, or the effect of possible political changes in the Constitution of the United Kingdom.

We desire to express our sense of great obligation to our Secretary, Mr. A. W. Cockburn, Barrister-at-Law, for his invaluable assistance in the conduct of the Inquiry, and in dealing with the great volume of evidence, both oral and documentary.

All of which we humbly submit for Your Majesty's gracious consideration.

FINLAY.	(L.S.)
ASKWITH.	(L.S.)
ALGERNON F. FIRTH.	(L.S.)
A. E. SHIPLEY.	(L.S.)
W. H. PEAT.	(L.S.)

A. W. COCKBURN,
Secretary.

Dated the 30th day of August, 1921.

PART I

Dominion Department of Agriculture

LIVE STOCK IMPROVEMENT MEASURES

Efforts of the Dominion Live Stock Branch for the Improvement of Canada's Herds and Flocks

BY R. S. HAMER, CHIEF CATTLE DIVISION

THE work of the Cattle Division of the Live Stock Branch of the Dominion Department of Agriculture has for its object the improvement of the quality (1) of breeding stock, both beef and dairy, and (2) the production, through better breeding and feeding, of superior quality in animals intended for the butcher's block. Considerable progress has already been made towards the attainment of these ends through the "Distribution," "Free Freight," and "Car Lot" policies of the Branch, particulars of which may be summarized as follows:—

Distribution of Pure-bred Bulls

The Live Stock Branch has been loaning pure bred bulls to specially organized associations in newly settled districts and in backward sections in the older provinces since 1913. The number of bulls so loaned up to August 15, 1921, was 3,408.

Up to 1920 all bulls loaned were purchased direct from breeders, it having been considered that for the Branch to invade even the larger sales with its heavy annual requirements would lead to complaint from private bidders. In

1920, however, it became apparent that the breeders entering bulls in the Provincial sales in Western Canada were entitled to more support than they were likely to get from private demand in view of the unusual conditions prevailing. It was, therefore, decided to give all the support possible to these sales by endeavouring to supply requirements from this source. The step proved most opportune and during the past two years the Branch has been able to secure an excellent lot of bulls at good values. The support given has been highly appreciated by contributors to the sales as it has unquestionably been instrumental in maintaining a good average price on the better bulls offered. At seven sales held in Western Canada in 1920, 225 bulls were purchased by the Branch and this year 236 were purchased at western sales. In addition, the Branch patronized this year one sale in Ontario and one in Quebec.

In the following table will be found the total number of bulls purchased for each province under the Distribution Policy during each year of its operation:—

	British Columbia	Alberta	Saskat- chewan	Manitoba	Ontario	Quebec	Maritime Provinces	Total
1913	3	20	33	27	11	0	0	94
1914	9	78	116	26	33	111	39	412
1915	21	76	124	28	53	170	45	517
1916	32	81	76	35	13	200	25	462
1917	22	71	70	37	39	165	13	417
1918	19	67	43	32	27	51	15	254
1919	13	104	77	35	41	62	44	376
1920	20	147	104	29	80	109	16	455
1921	23	111	109	84	30	60	4	421
	162	755	752	333	277	928	201	3,408

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Car Lot Policy

Under the terms of this policy the Live Stock Branch pays reasonable travelling expenses of farmers residing in Canada who purchase stock at central stock yards for return to country points. In Eastern Canada the assistance rendered is confined to purchases of female breeding stock—cattle, sheep or hogs. In Western Canada the policy covers stocker and feeder cattle in addition to breeding stock. Purchasers are required to fulfill certain requirements of the Department in connection with their shipments, and to give satisfactory assurance that none of the stock is being purchased for speculative purposes.

This policy has proved a very valuable educational agency in that its terms have encouraged farmers from all over the country to visit the stock yards and to become acquainted with methods of doing business at these points. It has also played a very important part in encouraging a return of unfinished cattle and sheep to country points for further feeding, and in the return of young female breeding stock, particularly from yards in Western Canada.

The policy has been in effect at the stock yards of Western Canada since the fall of 1916. On the yards at Toronto and Montreal it has been in effect only since May, 1918. Total shipments made each year under its terms are given in the following table:—

CAR LOT POLICY SHIPMENTS TO JANUARY 1, 1921

Year	Steers	Heifers	Sheep
1916 (3 months)	6,208	3,113	1,407
1917	11,234	10,411	1,800
1918	20,703	18,745	7,978
1919	22,490	17,550	9,408
1920	14,009	7,957	6,317
Total	74,744	57,776	26,910

The policy has not been an expensive one as is indicated by the fact that the cost to the Department of all cattle shipped under its terms during a period of three years averaged only 59 cents per head. The average cost of all sheep shipped during the same period was only 18½ cents per head.

Free Freight Policy

The Free Freight Policy, which has been in operation since the fall of 1917, was inaugurated by the Live Stock Branch in co-operation with the railway companies of Canada, with a view to preventing, as far as possible, the slaughter or exportation of useful heifers, young ewes and young sows offered for sale on the open market at the cen-

tral stock yards. Under this policy, farmers are entitled to ship from stock yards to country points female breeding stock, of the classes mentioned, without payment of freight charges on same, provided the stock was not purchased for speculative purposes.

During the time the policy has been in operation it has been very widely taken advantage of by farmers anxious to secure breeding stock, and it has unquestionably been one of the most important factors in promoting the return to country points of a large percentage of useful females offered on the yards at Edmonton, Calgary and Winnipeg. Since the inception of the policy in September, 1917, shipments under its terms from the different yards, up to January 1, 1921, numbered as follows:—

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Name of Yard	Heifers	Ewes	Sows
Edmonton	24,086	8,561	155
Calgary	21,949	32,513
Winnipeg	20,097	9,206	203
Prince Albert	51	160	.....
Moosejaw	61	.....	.....
Toronto	1,872	10,084	.....
Montreal	164	452	11
Total	68,280	60,976	369

Shipments for the twelve months ending January 1, 1921, were 9,742 heifers and 10,964 ewes.

DISTRIBUTION POLICY FOR PURE-BRED RAMS AND BOARS

BY A. A. MacMILLAN, CHIEF SHEEP AND SWINE DIVISION

THE distribution policy has now been in operation for eight years. Assisted by the "Premium" policy, it has encouraged many farmers throughout the Dominion to purchase pure-bred rams. It was not, therefore, considered necessary to encourage the extensive loaning of rams or boars during the past year, and consequently few new rams and boars were distributed. Greater discrimination was exercised in dealing with new applications, and only those were accepted that came from districts where returned soldiers were settling, and from newly settled districts, or districts where improvement of sheep and swine was considered essential. A number of the rams and boars already loaned had either outlived their period of usefulness or had been two years with associations. The older animals were sold for the block, and those

that gave evidence of further usefulness were either sold for breeding purposes, exchanged between associations, or transferred to new associations whose applications had been accepted. The rams loaned have effected a decided improvement in the breeding of the flocks and quality of the market lambs in which they have been used and as a result of their use farmers who are now in reasonably good circumstances are willing to purchase a ram in the regular way. In view of the recent development of interest in swine raising there is an increasing demand for the loan of boars in districts that are now passing from out and out grain farming to mixed farming with more livestock. Settlers in such districts are for the most part new to the raising of swine and the distribution of boars in such districts has particular value in improving the bacon type of hog.

STATEMENT OF RAMS LOANED UNDER DISTRIBUTION POLICY

Province	Oxford Shrop.	Leic.	Linc.	Hamp.	Cheviot	Suffolk	Total
Quebec	50	110	137	1	33	10	341
Ontario	15	15	30	7	..	..	67
Manitoba	56	9	3	..	..	..	68
Saskatchewan	1	..	1	2
Alberta	6	18	24
British Columbia	3	1	4
Total	131	152	171	8	33	10	506

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STATEMENT OF BOARS LOANED UNDER DISTRIBUTION POLICY

Province	Berk.	York.	Duroc.	Chester	Tam- worth	Poland, China	Total
Prince Edward Island	2	..	..	..	..	..	2
Nova Scotia . . . . .	..	2	..	..	..	..	2
New Brunswick	1	..	..	..	..	..	1
Quebec . . . . .	..	24	..	8	1	..	33
Ontario	1	10	..	..	..	..	11
Manitoba	5	2	..	..	..	..	7
Saskatchewan	5	..	4	..	..	..	9
Alberta	10	1	5	..	..	1	17
British Columbia	6	1	2	1	..	..	10
Total	30	40	11	9	1	1	92

Premium Policy

Under this policy the first premium has been paid on six hundred and nineteen applications, and the introduction of this number of pure-bred rams for the first time on farms throughout the Dominion has proved to be one of the most effective means of eliminating the scrub ram and improving the quality of market lambs. The clause covering docking and castrating under this policy has also been a very effective means of bringing about the general trimming of lambs, especially in the districts that were most backward in this regard. As a result of requests and the

consequent holding of many demonstrations in docking and castrating, it was possible to reach not only farmers that had received the bonus, but many others as well, thus educating them to the benefits of these operations. Inspections were made or reports received on all flocks affected by the policy and with few exceptions the conditions were complied with. Applications for the year 1921 will be in the neighbourhood of 500.

The following table gives the number of applications for premiums received from each province, indicating also the breeds of rams purchased:—

Breed	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Shropshire	22	21	19	84	27	1	..	11	2
Leicester	9	1	13	62	12	1	1	..	..
Oxford	6	13	35	71	74	10	6	13	2
Hampshire	2	5	7	31	..	1	..	..	2
Lincoln	2	..	3	2	6	..	..	..	..
South Downs	4	..	..	..	..	..	..	..	..
Cotswold	1	1	2	1	2	..	..	..	..
Cheviot . . . . .	..	1	9	10	1	..	..	..	..
Dorset . . . . .	..	..	5	..	5	..	..	..	..
Suffolk . . . . .	..	..	..	..	..	..	1	1	1
Total	46	42	93	261	127	13	8	25	7

REPORT ON COW-TESTING, 1920

BY A. H. WHITE, SENIOR DAIRY PROMOTER, DAIRY AND COLD STORAGE BRANCH

THE cow testing work in 1920 was carried on under the same general plan as during the past two years. There was an increase in the total number of herds and cows under test, and the largest increase was in the pro-

vince of Quebec where the provincial authorities put on a campaign for this work through their Dairy Inspectors. The work, however, was increased in several other provinces and is becoming a permanent practice on many dairy farms.

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In each province, the local Dairy Promoter has been carrying on some special work, generally with the co-operation of the Provincial Dairy Branch, to foster and increase this work in the dairy districts, and they have met with some measure of success. However, the regular work of organizing and supervising the work took up most of the time of each Dairy Promoter. A brief review of the work in each province during the season of 1920 will be found in the following paragraphs.

The work in Alberta received a setback when the Promoter in charge resigned, and for two months there was no one to look after and organize the testing centres there. However, the men who realized the value of the work remained in the testing centres and after a new appointment was made, a new impetus was given to the work and several new testing centres were started.

In Saskatchewan, there was a slight decrease in the number of herds and cows under test, but this was due, somewhat, to the severity of the previous winter, and the farmers were rather backward about testing their cows because they were in such poor condition. The Promoter in that province did a lot of pioneer educational work in the southeastern portion of the province while travelling on the Better Farming Train organized by the Provincial Department of Agriculture. This work consisted largely in giving lectures and demonstrations at the different stops along the line, and great interest was manifested. Previous to last winter, there had been practically no educational work done at all in this section of the province. Later on in the summer, the district was again visited, a few testing centres were organized and the farmers instructed on the care of milk and cream. The Dairy Tests at several fairs were also supervised at the request of the Fair Committees. These short tests are becoming popular as a basis for judging dairy cattle in milk. A Greater

Average Production Contest, organized by the Provincial Dairy Branch of Saskatchewan but based on records received at the Dairy Branch, Ottawa, and at the factories, was carried on among the farmers of the province and some time was devoted to this work.

The Extension Service of the Department of Agriculture, Winnipeg, assisted the cow testing work in Manitoba by introducing a cow testing project in connection with the Boys' and Girls' Clubs organized throughout the province. There is a great deal of promise in work of this kind as it is much easier to reach the boys and girls than the "grown-ups."

In Ontario, there was a slight increase in the work but there should be many more herds under test. A large number of farmers are keeping records for themselves but when compared with the total number of farmers in the province, the percentage is very small. There are a number of good herds in the province but there could be many more if the farmers would use more generally the cow testing association to increase production in the average grade herd. Dairy Tests at several fall fairs and at the Ottawa Winter Fair were supervised by the Promoter in charge of the work in the province.

The main feature of the work in Quebec was the campaign carried on by the Provincial Department to increase the number of herds under test. This campaign was carried on during the month of March by the Dairy Inspectors and was highly successful as evidenced by the number of farmers who agreed to put into practice the keeping of dairy records. The actual number of herds and cows recorded was increased by over 100 per cent and might have been more, had the supply of scales and bottles equalled the demand. There were over 22,000 cows recorded for part of the season and a great many for the full year. The need in Quebec is for the farmers to realize the importance and value of

keeping records for the full year, and not for only three, four or five months as a great many do.

In Nova Scotia, cow testing and better dairy methods are being fostered in several ways. In co-operation with the Educational Department, a school essay competition was carried on during the year. This was to encourage the school children and interest them in better dairy methods. By the kindness of Creamery Managers, their patrons were constantly reminded of this work, by short mottos or sentences stamped on their monthly cheques. Better and more abundant feeding was advocated strongly last spring, and by getting a number of farmers to sow small areas of oats, peas and vetches, the value of this crop was demonstrated in a very practical way. The farmers who sowed this crop last year realized the importance of some such soiling crop and are planning to sow larger areas this spring. Another method of reaching the people was by means of a booth at several fall fairs. Practical demonstrations and charts on cow testing helped to bring this matter to the attention of a great many farmers.

In New Brunswick, the work was carried on in the regular way. Some difficulty was experienced in getting capable men to do the testing at the different centres, but the number of cows under test was increased to a small extent. Lectures and short course work in co-operation with the provincial authorities were included in the work performed.

In Prince Edward Island, a Dairy Herd Competition was carried on and based on the records kept according to the rules of the Dairy Branch, Ottawa. Quite a number of farmers are entered in the different classes in this competition.

In the prairie provinces where dairying is as yet only considered a side line in a great many districts, the work of the Dairy Promoter is largely one of propaganda and education. In many

sections it is real pioneer work, and although no tangible results are immediately apparent, it is essential to bring this work to the attention of these districts for the benefit of the dairy industry at large. This educational feature of the work also applies to certain sections of the maritime provinces and of Quebec.

However, in Ontario and the older sections of Quebec, it is a matter of getting the farmers to take up cow testing as a means of herd improvement. Nearly every district in Ontario has had a practical demonstration of the value of this work and yet very few farmers seem to feel the need of it in their own business. Cow testing is not only essential to building up a dairy herd—it is also needed to keep up a standard of production already reached. There are always some poor producers to be found in every herd, and they can only be eliminated when records are kept and production is known.

A bulletin on cow testing, No. 58, Dairy and Cold Storage series, was published during the year giving a report of the work during 1919 and also showing how the work had progressed during the past few years. A questionnaire was also sent out asking for information regarding kind of sire used, cost of feed during the year, etc., and the following is a brief summary of the information contained in the answers from farmers all over the Dominion who have had some experience with Dairy Records. Although these questionnaires were sent to all farmers who have sent in records, not more than 25 per cent returned them fully filled in.

There are many grade sires still being used in the dairy herds of Canada. Out of a total of 446 farmers who replied, 134 were using grade sires, 151 farmers had been using pure bred sires for less than five years and 159 had been using them for more than five years. It is safe to say that if all questionnaires had been answered, the percentage of grade sires would have been much greater.

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The men who have been using pure bred sires for five years and who have been keeping records for three years or over, all report increases in production of 30 to over 100 per cent. This is significant, because if the production of the average dairy herd is to be increased, and the quality of the stock improved, it is imperative that pure bred sires be used and that a continual weeding out of the poor cows takes place.

The large proportion of farms are not equipped with silos, showing that adequate provision is not made for a supply of succulent feed for winter. There were only 92 farmers reported having silos and more than half of these were in Ontario. To date, the silo has not been used very extensively by the dairy-men of the prairies and the maritime provinces. However, now that it has been demonstrated that sunflowers can be successfully grown and made into silage in nearly every part of the prairies, reports show that many farmers are contemplating building silos. This is also true in the maritime provinces where oats, peas and vetches are used for a silage crop.

The majority of farmers kept no feed records. Most of them estimated an average feed cost per cow, while a few had no idea at all what it cost to feed their herd during the season. It is absolutely essential, if full particulars of the business of the dairy are to be had, that feed records as well as production records, be kept. The

widely varying feed costs which were estimated by the farmers seem to point to the fact that some men are feeding more than should be fed for economical production while others are doing the reverse and feeding too stintingly. The estimated feed costs ranged from \$40 per cow per year to over \$140, while the average for all was \$82. Many farmers also reported having disposed of several of their poor cows to the butcher and these are on the right path to increased production. But these answers still indicate the great need of more pure bred sires, more silos to insure a plentiful supply of milk-producing food, and more attention given to the matter of carefully keeping feed and production records.

The following tables will give a concise statistical summary of the work in the different provinces during 1920. These figures are very general and do not go into detail, but will give some idea of what is being done to assist the farmer with the grade herd to put that herd on a more efficient basis. This is done by showing up the poor cows so that they may be "weeded out," and also by the selection of the best producers which can be used for breeding stock.

A great many farmers have been helped and aided in building up a herd of high producing individuals by keeping dairy records. But a great many more should avail themselves of this help offered by the Dairy Branch, Ottawa.

TABLE I—HERDS, COWS, TESTING CENTRES, SAMPLES TESTED AND AVERAGE SIZE OF HERDS

Province	Number of Herds	Number of Cows	Testing Centres	Number Samples Tested	Average Size of Herds
British Columbia	24	102	5	610	4.2
Alberta	38	515	24	3,124	13.5
Saskatchewan	71	663	18	3,155	9.4
Manitoba	78	580	23	2,214	7.4
Ontario	446	4,911	66	20,835	11.0
Quebec	2,474	22,229	353	87,594	8.98
New Brunswick	180	1,177	18	4,245	6.5
Nova Scotia	372	2,224	39	11,876	5.9
Prince Edward Island	164	976	18	5,765	5.9
Total and averages	3,847	33,382	564	139,418	8.67

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The foregoing figures show that Quebec has the majority of herds and cows under test, which was due to the work done during March by the Dairy Inspectors of the Provincial Department of Agriculture.

Although records were received from the 3847 herds for some part of the season, a large number were only in for a few months and did not receive the full benefit of the work. Dairy Records will serve the farmer best when complete for each cow for the full year.

TABLE II—NUMBER OF HERDS AND COWS TESTED IN 1919 AND 1920 BY PROVINCES

Province	Herds		Cows	
	1919	1920	1919	1920
British Columbia.. . . .	34	24	215	102
Alberta.. . . .	64	38	820	515
Saskatchewan.. . . .	74	71	773	668
Manitoba.. . . .	83	78	1,035	580
Ontario.. . . .	417	446	4,214	4,911
Quebec.. . . .	1,046	2,474	10,374	22,229
New Brunswick.. . . .	250	180	1,065	1,177
Nova Scotia.. . . .	207	372	2,714	2,224
Prince Edward Island.. . . .	241	164	1,307	976
Totals.. . . .	2,416	3,847	22,517	33,382
Increase.. . . .	1,431 herds			10,865 cows

TABLE III—AVERAGE PRODUCTION BY PROVINCES OF ALL COWS RECORDED FOR THE FULL YEAR 1920

Province	No. Herds	No. Cows	Average Production		
			Lb. Milk	Test	Lb. Fat
British Columbia.. . . .	10	38	7,421	3.9	289.9
Alberta.. . . .	13	186	7,046	3.4	239.7
Saskatchewan.. . . .	10	114	5,292	3.7	199.8
Manitoba.. . . .	7	101	5,398	3.5	192.1
Ontario.. . . .	65	540	7,094	3.5	248.8
Quebec.. . . .	196	1,752	4,659	3.8	179.2
New Brunswick.. . . .	28	156	5,010	3.9	194.6
Nova Scotia.. . . .	105	624	5,570	3.9	222.7
Prince Edward Island.. . . .	42	234	6,653	3.7	247.2
Totals and averages.. . .	476	3,745	5,480.8	3.76	206.2

These records are for the herds and cows under test for the full calendar year, except the months when they were dry.

The average production of the cows in Quebec is so low because a great many were milked only for short periods of seven, eight or nine months, while in the other provinces the milking periods were longer. Then, again, there were a number of herds in which the keeping of dairy records was a new thing, and these had not been graded up as the majority of the herds in Ontario and the other provinces have been.

Cow Testing Taken Over by Provinces

Since the first of May, cow testing in Saskatchewan and Manitoba has been

carried on by the provincial dairy branches. The transfer of the work to provincial authority is in accordance with the announcement made to the Deputy Ministers of the Provincial Departments of Agriculture by the Dairy Commissioner at the conference held in Ottawa during March, 1920. This work is properly a provincial function and can be carried on more extensively by the provincial departments of Agriculture with their large staff of field men. The Saskatchewan Department will assume full control of the work there, while the Manitoba Department will, for the present year, only look after the field work. The Dominion Dairy Branch will continue to do the clerical work in connection with keeping the

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records and pay for the testing as in the past.

From all indications, there will be another decided increase in the number of herds and cows recorded in 1921. The Quebec Department of Agriculture is continuing this year with the work which was started last spring and an increase can be counted on in that province.

In Alberta, *Agricultural Alberta*, a new farm paper published in Edmonton, has organized a production competition which will be supervised by the Dairy Promoter and will probably increase the work there.

In Saskatchewan, the Dairy Promoter accompanied the Better Farming Train through the southwestern part of the province, giving lectures and demonstrations on cow testing work; and in

Manitoba, the work will be carried on and extended through the Boys' and Girls' Clubs by the Extension Service of the Provincial Department in co-operation with the dairy branch.

In Ontario, many inquiries are coming in for assistance in organizing this work and many new herds are expected from different districts. A new feature in connection with cow testing organization work is being tried in a section of milk producers. A large association has been organized by the local minister, who has had a great deal of experience in dairying, for the benefit of the members of his church. He already has over twenty farmers keeping records and a great deal should be accomplished to increase milk production in this community through the initiative of its minister.

THE TOBACCO DIVISION

BY F. CHARLAN, CHIEF OF TOBACCO DIVISION, DOMINION EXPERIMENTAL FARMS

THE improvement of native tobacco, to make it more suitable for the Canadian manufacturing industry, and bring about a more general use of the same, has been, from the beginning, one of the main objects of the Tobacco Division, one of the branches of the Dominion Experimental Farms.

The first results of these efforts were the creation of the cigar tobacco industry in the province of Quebec, and the establishment of sorting and fermenting warehouses, which have greatly contributed to the prosperity of the districts in which they are situated. The binder and filler tobaccos of the province of Quebec have now a well-established reputation.

In Ontario, tobacco growers have specialized for a number of years in the growing of White Burley, a heavy yielding variety, used chiefly in the manufacture of pipe and plug tobacco.

Uniformity of the products was sought by the establishment of standard improved types, and this uniformity is now and has been for some time an accomplished fact, mainly through the work done at the Harrow Experimental Station. The seed from White Burley selections made on this station yield crops that are generally superior in weight to those coming from imported seed, and considerably earlier. The uniformity of type has also been maintained for a number of years. The result is a considerable improvement in quality. The same may be said of the growing of bright flue-cured tobacco of the Virginia type.

Increased yield, through the adoption of suitable rotations and the scientific use of manure and chemical fertilizers, is one of the main objects of the division. Anything that tends to increase the yield of the crop also tends to lower the cost, and thereby to increase the net profit to the farmer.

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Methods of harvesting and curing also receive special attention. An otherwise good crop may be spoiled by the treatment it receives during harvesting and curing. Demonstrations of the most economical methods have been given, including those insuring the best and most rapid curing, and the prevention of the deterioration that is liable to occur in the curing process.

The problem of the fuel to be used in the flue-curing of Ontario-grown Virginia tobacco has become an important one, owing to the scarcity of wood in the district and the decreased supply of natural gas. A new system of heating permitting the use of coal has been installed in one of the curing houses at Harrow and will be tried this year. It is hoped that a great saving may be realized and that a fuel more easily available than wood or gas may be employed.

In order to make known more rapidly the results obtained at the Experimental Stations, and at the same time to widen the scope of the Division, a large number of experimental plots, conducted in co-operation with the growers, have been established in the growing centres of Ontario. Experiments made on such plots deal with all phases of growing and curing, and lay special stress on the scientific use of fertilizers. Thorough preparation of the soil is of great importance in tobacco growing. The advantages of fall ploughing have been demonstrated beyond question; the soil retains more moisture, a more complete use of plant food is made, and most of the insects that attack the plants in the spring, are destroyed at the beginning of the winter.

A study of the various types of beds has showed that, in all parts of Canada where tobacco is grown, a semi-hot-bed under glass is the only one that gives absolutely dependable results. The canvas covered bed has been condemned and is fast disappearing.

A special study of tobacco soils in Canada has been made, and these soils have been classified according to their physical texture and compared with tobacco soils in other producing countries. The main part of this work was done in Ontario, but it will be extended to the province of Quebec as rapidly as possible.

The disinfection of seed beds to rid them of germs of diseases that might infect the crop, is also the object of special attention. Great stress was laid on the manner of disinfection with the use of steam under pressure, and the use of formaldehyde. The practice of disinfecting moulds by steam is becoming more and more common in the tobacco-growing districts of Ontario.

A very thorough study is being made of the most suitable varieties for our climate and for the requirements of the Canadian manufacturing industry. Varieties already introduced and accepted by the trade are also being improved by selection. It may be stated that the strains of White Burley and Comstock, selected by the division, are not in any way inferior to similar strains of the same variety introduced from the United States. They also have the advantage of being acclimatized in this country. The use of tobacco seed grown in Canada is recommended, not only as a means of obtaining better yields and earlier crops, but also in order to avoid such unpleasant surprises as may occur when seed of unknown purity and origin is used.

In order to secure the greatest possible uniformity in the commercial characteristics of the crop in each district, the Tobacco division has endeavoured to produce a sufficient quantity of selected seed to satisfy all requests. There are few tobacco growers in Canada at the present time who have not tried the seed supplied by our experimental stations and who have not been satisfied with the results.

As regards the control of diseases, as soon as the division was able to secure seed from root-rot resistant varieties it has endeavoured to propagate the same as rapidly as possible in districts affected by the disease. A special selection of resistant varieties is also being made at the Harrow experimental station, with a view to improving the shape of the leaf and increasing the yield. Appreciable results in this direction have already been obtained.

A close study is made of the distances at which tobacco should be transplanted, in order to obtain the best results in quality as well as in yield. This is one of the most variable factors, depending on the nature and the fertility of the soil and on the conditions of the season. However, averages have already been established that are suitable in the majority of cases.

A study of the methods of control for insects injurious to tobacco fields has enabled the division to recommend the best insecticides and the best methods of application.

During the last few years the division has endeavoured to publish as complete statistics as possible of the production of tobacco in Canada. Appreciable results have already been obtained for the districts of Ontario, and it is hoped that with the co-operation of the Customs and Inland Revenue Departments, this work may be extended to the whole of Canada. It cannot be doubted that a more complete knowledge of the requirements of the Canadian industry and of the quantity of tobacco produced in Canada will tend towards the stabilization of prices, one of the most important factors in stabilizing the industry.

GOPHER CONTROL BY MEANS OF CALCIUM CYANIDE

BY G. E. SANDERS, ENTOMOLOGIST IN CHARGE INSECTICIDE INVESTIGATIONS,
ENTOMOLOGICAL BRANCH

IN 1920, Mr. A. Kelsall, of the Entomological Branch, tested chlorine gas for the control of gophers at Carlyle, Saskatchewan. It was found by him that gophers were very effectively controlled by injecting about one-tenth of a pound of chlorine gas, liberated from cylinders of liquid chlorine, into each gopher burrow. A brief account of this work appeared in the November issue, 1920, of the *Agricultural Gazette of Canada*.

In 1921, the writer continued these experiments and in addition tested a number of other chemicals. Among these, a comparatively new cyanide, in peculiar physical form, manufactured in electric furnaces at Niagara Falls, Ontario, showed great promise. The compound contained approximately 50 per cent calcium cyanide and is marketed in small flakes, grayish-black in

colour, about $\frac{1}{32}$ of an inch in thickness and about $\frac{1}{4}$ to $\frac{1}{2}$ of an inch in diameter. It is not nearly so deliquescent as sodium or potassium cyanides. Its physical form, as well as its chemical constitution, assist in its comparatively rapid decomposition when placed in contact with damp earth, or less rapidly on exposure to air, the products being prussic acid gas and hydrated lime.

The first promising experiment with this material consisted in treating half a dozen burrows. Following this, 13 burrow openings were closed and 12 of these that were opened the next day were treated, about $1\frac{1}{2}$ ounces of the mixture finely ground being placed down each burrow. Six hours after none of the twelve treated burrows were opened although gophers had started to dig into all of them from the outside.

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Examination twenty-four hours later showed that only two of the 12 treated burrows had been opened.

The next experiment, on July 11, consisted in treating an area of approximately two and one-half acres containing 62 gopher burrows. In this experiment the flake form was used. The material was carried about in an open bucket and dipped out with a long handled iron spoon and placed as far down the burrow as was possible. The spoon held approximately $2\frac{1}{2}$ ounces and one spoonful was used in each burrow. A handful of weeds was placed in the entrance of the burrow and the iron spoon used to cover the weeds with earth. Placing the weeds in the entrance prevented the earth from covering the cyanide. Forty-eight hours later, not a single burrow of the 62 closed had been opened. Gophers were particularly active in the immediate area, the land being very light, sandy and dry.

The next experiment consisted in treating in the same manner as the last, 69 burrows in heavier land. Twenty-four hours after treatment, two out of the 69 treated burrows had been opened.

In another experiment a jar was measured and the amount of the calcium cyanide compound calculated to give the same concentration of gas as would obtain if $2\frac{1}{2}$ ounces were placed in a burrow 40 feet long. A little earth was placed in the bottom of the jar and the cyanide thrown in on top of it. A live gopher was then introduced and the jar closed. The gopher immediately showed the effect of the cyanide; in a short

time its muscles became rigid and the neck curved backwards until the head almost touched the back. The body became limp when the gopher died. Fifteen live gophers were available and all were killed in this jar. It was found that five seconds exposure to the gas was sufficient to cause death. This explained the excellent results we had obtained in the field.

We have not as yet definite data as to the cost of the cyanide treatment but it is thought that it will approximate that of strychnine poisoned grain.

The cyanide used, as above mentioned, is for the most part calcium cyanide or the lime salt of prussic acid. It must, therefore, be regarded as a dangerous poison and one which should not be stored carelessly about buildings. It should, in fact, be handled with extreme care such as are arsenic, strychnine and other poisons used in agriculture with which the public are familiar.

With strychnine-poisoned grain, there is danger in storing it in sacks in which it is always shipped, and in the field in spite of repeated instructions to put it down the burrow, the farmers almost invariably scatter it on the surface about the entrance of the burrow, thus endangering both wild and domestic animal life.

Calcium cyanide has the advantage of being as effective at one season as at another while poisoned grain is most effective for a short time only in the spring before the grasses start, so that even though it may not compete economically with poisoned grain for spring work, it should be a valuable adjunct for summer control.

PART II

Provincial Government Departments

INVESTIGATIONAL WORK AT THE ONTARIO AGRICULTURAL COLLEGE

Field Husbandry

UPWARDS of one hundred district experiments in field husbandry are being conducted on about 2,500 experimental plots at the Ontario Agricultural College. In addition to these, a considerable amount of plant breeding and certain investigational work is in progress on the eighty or more acres devoted to Field Husbandry problems, among which are the following:—

1. The use of sunflowers for silage purposes where the best varieties of corn will not grow satisfactorily in Ontario.

2. The importance of scarified or unscarified sweet clover seed when used on the farm for definite purposes.

3. The prospective value of the annual white-flowering or "Hubam" sweet clover as a farm crop.

4. The intrinsic value of the O.A.C. No. 104 variety of winter wheat.

5. Yields per acre of the Tall oat and the Orchard grass when used for pasture purposes.

6. Comparative value of different varieties of alfalfa showing the importance of Grimm and Ontario Variegated for yield and hardiness.

Bulletins or circulars on the above work have been issued.

Animal Husbandry

The following is a brief outline of the investigational work of the department of Animal Husbandry:

Horses—

The cost of maintaining farm work horses for the year.

Beef Cattle—

1. The cost of maintenance of breeding herds of Shorthorns, Herefords and Aberdeen Angus.

2. The cost of maintenance of breeding bulls—Beef and Dairy.

3. An experiment to show the value of breeding in beef production.

Dairy Cattle—

Cost of maintenance of dairy cows of the different breeds in relation to production.

Sheep—

1. Comparative weights of lambs of the various breeds.

2. Comparative wool clip of the various breeds.

3. An extensive experiment to prove or disprove the statement that it pays to fatten lambs, showing also the relative gains and profits from feeding ram lambs, ewe lambs and wether lambs.

Swine—

1. An experiment to find out the effect of feeding salt to hogs.

2. The cost of maintenance of brood sows.

3. The amount of feed required to make a pound of pork.

4. A comparison of size of litters of the following six breeds: Yorkshire, Berkshire, Tamworth, Poland China, Duroc Jersey, and Chester White.

Poultry—

1. The breeding of high laying hens and the distribution of eggs for hatching and male birds, together with the culling of breeding station flocks.

2. The accumulation of data in regard to the number of eggs laid by well managed flocks, bred similar to those at the breeding stations.

Bacteriology

1. Bacteriological analysis and plant growth tests of "Nitrobacter Soil Vaccine." This so-called "soil vaccine" is a commercial preparation recently put on the market and widely advertised.

2. Bacterial plant disease survey.

3. Continuation of the agglutination test for contagious abortion of cattle to determine its usefulness as a factor in the eradication of the disease from herd.

4. Investigational work on bee diseases, including American foul-brood and European foul-brood.

Service Rendered to Farmers

1. Bacteriological analysis of well water samples and questionable food-stuffs.

2. Examination of poultry and farm animal specimens for presence of infectious diseases.

3. Examination of plant specimens for bacterial diseases.

4. Preparation and distribution of legume bacterial cultures.

5. Preparation and distribution of information regarding the nature and varied functions of micro-organisms on the farm and in the home.

Dairy Bacteriology

In the subdivision of dairy bacteriology a number of investigations are being conducted at the present time in co-operation with the Dairy department, of which the following are the more important:

1. Study of sanitary quality of milk delivered to the college dairy;

2. Pasteurization and neutralization of cream for butter making;

3. A study of whey-cream butter.

In co-operation with the Dairy Branch, Dominion Department of Agriculture, work is being done;

1. On yeast and mold content of creamery butter in connection with the Dominion Butter Scoring Contest;

2. A study of the sanitary handling of milk machines;

3. Investigation of new methods of bacteriological analysis.

Service Rendered to Farmers

Tests of abnormal milk to demonstrate cause, and distribution of information *re* method of control.

Investigation of any serious problem of a bacteriological nature relating to milk and its products as it arises, and as time and other work previously planned permit.

Work Recently Concluded—

"Yeasts and Molds in Pasteurized Cream Butter."

Bulletin on "Neutralization and Pasteurization of Sour Cream for Buttermaking," now in the press.

Botany

1. Potato disease investigations in co-operation with the Agricultural Representatives. Results of this work published in the report of the Minister of Agriculture, Ontario, for 1919.

2. Plot experiments with potato diseases.

3. Spraying experiments in the control of the late blight of celery. *See* O.A.C. reports for the last 5 years.

4. Experiments to test the spray method of applying concentrated formaldehyde solution for the control of oat smut. *See* O.A.C. bulletin 229 revised March 1921.

5. Investigation of the cause and means of control of winter blight or streak tomatoes. *See* O.A.C. reports 1917, 1918 and 1919.

6. Experiments in the control of Pod Spot or anthracnose of beans.

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7. Experiments in the control of Rhizoctonia or Black Scurf of potatoes.

This department is at the service of farmers for the identification of weeds, weed seeds, grasses, poisonous and edible mushrooms, and is prepared to make purity tests of clover, grass and seed grain for farmers and seedsmen. The department is also prepared to give information concerning the best methods of dealing with the more troublesome weeds of the province and the prevention of diseases of cereals, vegetables, and ornamentals. Information is also available concerning the preparation and application of the more important fungicides.

Chemistry

Much time is being devoted at present to a study of soils in connection with the soil survey. As a follow-up to the survey, three demonstration plots have been established (*See "Soil Fertility Investigation in Ontario" in this issue*).

Insecticides and Fungicides—

The chief problem studied under this head was the composition of lime and sulphur wash as affected by the addition of various arsenicals, with and without the addition of hydrated lime. There is an increasing number of preparations coming on the market for the use of the orchardist and an endeavour is being made to study these materials with a view to giving information as to their value.

Wheat and Flour—

Besides doing the more or less commercial work for the millers and bakers of the province and studying the relative milling value of the various varieties of wheats grown on the experimental plots, considerable work has been done in investigating various factors in the making of bread. A bulletin on the subject has been issued.

Cattle Feeds.—The most serious matter affecting the value of mill feeds is

the presence of weed seeds that are poisonous to young stock. These seeds are rich in protein and fat and make the guaranteed analysis of the feed show up well. The new Federal Government regulation will help to remove some of the difficulty that the farmers have been labouring under in the use of shorts.

Service Rendered to Farmers

1. Assistance in solving soil problems and the adaptation of fertilizers to crops and soils.

2. Advising gardeners and orchardists regarding the chemical reactions that may occur with the use of various insecticides and fungicides now on the market.

3. Examining and in some cases analyzing and reporting on cattle feeds.

4. Examining and reporting on domestic water supply.

5. Examining and reporting on the milling quality of wheat and problems in connection with flour; assisting farmers in any way possible with the whole question of human and cattle feeds.

Entomology

1. Investigation of the life history, habits and distribution of the European corn borer in Ontario and a study of control measures for the insect.

2. A study of the practical value of various spray materials and other insecticides and of the life history of various insects affecting fruit trees and control measures for same.

3. Investigation of the life history of the cabbage maggot and control measures under field conditions.

4. Direction of work in grasshopper campaigns.

The department is always at the service of the Agricultural Representatives in identifying injurious or other insects and in advising in regard to control measures for the former.

Physics

Survey of Water Systems.—Survey of existing Water Supply, Water Systems and Sewage Disposal of the farms of Markham township, with a view to obtaining data on the difficulties being encountered and needs felt by the farmers, so far as water systems on the farm are concerned.

Tractor vs. Horse-power on the farm.—Tractor versus Horse-power on the Ontario farm has formed the basis of a survey of the province, and the following conclusions have been drawn from data secured:

A tractor in the hands of an expert pays on an average farm of over 100 acres. In the hands of any one but an expert, it does not pay under any conditions. A saving of about \$120 per year is effected by substituting a tractor for horses and about 15 per cent more land is cultivated.

Life of a tractor is approximately 10 years.

Practically all tractors used are of the 4-wheel type and 12-24 horse-power.

Two and a half horses are replaced by a 12-24-horsepower tractor.

Reduction in the number of horses replaced is not so large as might be expected, practically no horses having been disposed of except those kept for use at a time of peak load on the farm in the spring.

Mansfield Water Finder.—The Mansfield Finder has been tested and found wanting under Ontario conditions. Ontario is badly in need of a survey of geological conditions to determine the "possibility" of finding water in many places where useless drilling is being done. Practically no information is available except through the medium of data in the hands of local well drillers and these seldom keep logs of the wells drilled.

Lightning Rods and Rodding System.—Practically any pure copper rods on the market to-day are recommended if

over 3 ounces per foot in weight. Rods of two metals are not recommended.

Rodding methods are improving rapidly due to educational work being carried on by the rodding companies themselves, by lectures from the members of the staff, and by co-operation with the office of the Fire Marshall for Ontario in inspecting and criticizing systems throughout the province.

Drainage Tile.—Concrete and clay tile from all parts of the province have in the past year been thoroughly tested for strength and absorptive power and they are found to be lacking somewhat in the latter respect.

Concrete tile are being used to a slight extent, but only in cases where either the farmer has no knowledge of the weak points of this sort of tile or where a reputable firm have established a reputation for good workmanship in their product. The majority of farmers are hesitating pending further investigation of the merits of the concrete tile.

There is as we see it nothing to fear under ordinary conditions in using concrete tile, but one is well advised to test the product before buying in large quantities, as improper curing of tile of this sort is resulting in many cases in a product unfit for use for drainage purposes.

Insulating Materials.—Relative Values of Insulating Materials were worked out, particulars of which are available.

Tests of Flax Chaff and Wood Wool are now being carried on and will be reported upon at an early date.

Farm Economics

Farm Economics is a comparatively new department, and, as farming is conducted in Canada, an exceeding important branch. For popular understanding, it may be defined as the business of farming, and thus distinct from the technique of farm practice details. It recognizes the fact that a farmer may be an expert tiller of the soil, an ex-

pert herdsman, an expert fruit grower, and yet not succeed in proportion as his expertness deserves, because of defective general management. His capital investment may be too great for his volume of business and he does not receive a proper interest income. His costs of production may be too high, and he has no margin of profit to reward him for his labours. He may be a poor salesman or he may be producing commodities not suited to his immediate markets. He may also be trying as too many Canadian farmers still try to do, to plough a lone furrow, to maintain his individualism in his business, and ignore the business opportunities offered by the co-operative society.

Farm Economics or Farm Management seeks to correct all this by investigating the financial condition of the farming business, costs of production, income in relation to capital investment, maintenance and working costs, available labour and its distribution and the most profitable selection of crops and other farm products in relation to available markets. Farm Management takes into account the layout of crops in rotation, the outlay of labour for most effective results, the outlay of cash for economical maintenance including breeding stock, fertilizers and feeds, the proper point of intensity of operation, the most profitable degree of specializa-

tion in the main products of a locality, and the most economical and effective mode of marketing the produce.

Service Rendered to Farmers.—The Department of Farm Economics renders service to farmers in three different ways:

1. In devising and presenting elementary systems of bookkeeping that are suitable for the average farmer's needs.

2. In presenting, through bulletins, reports and on the platform the information regarding farm business that is discovered in the surveys or investigations conducted on 1,500 Ontario farms, representing all types of farming found in the province. In the districts actually surveyed, each farmer from whom information is obtained is supplied with an itemized analysis of his own farm business to enable him to make such changes or improvements as may be suggested from such accurate knowledge of his own farm business and that of his neighbours.

3. In presenting to boards, commissions and price-arranging bodies accurate data on production of farm products on which more fair and equitable prices and conditions may be evolved than if this information were lacking. Much has already been accomplished along this line in relation to milk prices and freight rates on live stock.

SOIL FERTILITY INVESTIGATION IN ONTARIO

BY R. S. HARCOURT, PROFESSOR OF CHEMISTRY, ONTARIO AGRICULTURAL COLLEGE, GUELPH, ONTARIO

THE soil fertility investigations conducted by the Department of Chemistry of the Ontario Agricultural College may be divided under three headings:—

- I. Soil Survey;
- II. Laboratory and Pot Culture work;
- III. Field Experimental Work.

A preliminary soil survey has been made of the greater part of Western Ontario and a portion of Eastern Ontario lying between Ottawa and Morrisburg. This phase of the work was started by the late Professor A. J. Galbraith and continued by the late Mr. W. L. Iveson. The loss of these young and most capable workers in agricul-

tural science has been greatly felt. Since the death of Mr. Iveson in February, 1920, the soil survey has been held in abeyance pending the appointment of a successor.

Considerable laboratory and pot culture work has been done in connection with the soil survey, but here again progress has been held up for the past year owing to shortage of staff.

In connection with the field experimental work, three experimental grounds have now been established, one at the Ontario Agricultural College on loam soil, a second on fine sand soil near Simcoe, Norfolk county, and a third on heavy clay soil near Welland, Welland county.

The scheme of experiments on the field at the College consists mainly of fertilizer tests to ascertain the relative productive value of the various fertilizers supplying nitrogen, phosphorus and potassium respectively. The results obtained from these experiments are proving invaluable in answering the increasing number of inquiries from farmers, and especially in relation to the use of new fertilizers. Among other things these plots have clearly demonstrated that for mangels, nitrate of soda is very much superior to any other form of nitrogen we can supply and that the calcium cyanide applied as the only source of nitrogen is very much inferior to all our other common sources of this constituent. Our co-operative work throughout the country clearly indicates that the main mineral deficiency of our soils is lime and phosphorus. I am convinced that if we have plenty of organic matter in the soil and use a fair amount of stable manure that for most of the crops lime and phosphorus are the only fertilizer constituents that will give paying returns.

The Simcoe experimental field was started in the fall of 1919, and next year will bring all the ranges of the

rotation under complete experiment. Analyses of the sand soil of this field, which is typical of the main area of Norfolk county, show the main deficiencies to be organic matter, phosphorus and lime. By the system of cropping and fertilizing adopted, it is hoped to demonstrate a method whereby the Norfolk sand may be built up in these three ingredients and at the same time produce profitable crop returns. During the first season of 1920, encouraging progress was made in the results obtained, and an annual report of the work being done at Simcoe will be available shortly.

The field at Welland was taken over in September, 1920, and a large amount of work has been done in cleaning up the land, erecting a barn and planning out the ground in detail. Fifteen acres of the field have been tile drained and five acres left undrained as a demonstration of the necessity for drainage on this heavy type of soil. A rotation suitable to dairy farming, which is widely pursued in the county, is being followed, namely: 1, Wheat (seeded); 2, Hay; 3, Corn; 4, Oats ($\frac{1}{2}$ seeded); 5, (a) Hay followed by wheat, (b) Fallow followed by wheat. One range of experiments is being devoted to tests comparing the relative merits of ground limestone and hydrated lime in varying quantities. One of the main features in the fertilizer tests to be carried on throughout the rotation will be the determination of the most suitable form of phosphorus fertilizer for application on the Welland clay. The experiments with wheat will be seeded this fall, and the whole field will come under the rotation in 1922.

Mr. A. L. Gibson has been in charge of the work of establishing these experimental fields up to the present time, but is about to take up the position of Dairy Chemist at the College, and will be succeeded in the soil fertility work by Mr. S. Waterman, recently appointed to the Department of Chemistry.

THE ORDER OF AGRICULTURAL MERIT FOR THE PROVINCE OF QUEBEC

BY A. LETOURNEAU, DIRECTOR OF THE JOURNAL OF AGRICULTURE

THE Order of Agricultural Merit is an official institution of distinction, established in 1890 for the purpose of encouraging and honouring agriculture in the province of Quebec.

It includes four classes, viz:—

- (a) The graduates "diplômés" who have received a diploma;
- (b) The winners "laureates" of the bronze medal;
- (c) The winners "laureates" of the silver medal;
- (d) The winners "laureates" of the gold medal.

These marks of distinction are granted at an annual competition, which takes place alternatively in the five districts forming the complete cycle.

The Minister of Agriculture of the province is ex-officio, Laureate of exceptionally distinguished merit of the Order. There can be only one Laureate of the gold medal at each annual competition.

History of the Order

Great enthusiasm was shown during the first five years from 1890 to 1895, and many competitors entered. The actual number was 371. In the second cycle, 271 competitors were recorded. There were 222 in the third cycle, 175 in the fourth and only 152 in the fifth.

In the fifth division there were 32 competitors in 1914, compared with 82 at the first competition. In 1915 there were 9 competitors in the first division compared with 34 at the beginning.

The twenty-fifth anniversary of the foundation of the Order was celebrated in 1915, which was the year of Agricultural Progress at the Quebec Provincial Fair. Great and impressive demonstrations took place on September 1, 1915, in the presence of the highest official and civil personalities of the province, and more than 400 surviving

laureates. On this occasion a high mast was erected by the laureates themselves, to commemorate the celebration of this anniversary.

Progress

In 1915 the Honourable Mr. Caron, Minister of Agriculture, said with remarkable foresight:—

"This celebration opens a new era in our annals. It marks an important step in the development of our agriculture. It brings out in a striking manner the high merit of the laureates and shows them as an example to be followed by the whole population. The good effect of this splendid celebration is shown in the agricultural awakening which is taking place in this province. I hope this fine movement will continue, and I trust that the Order of Agricultural Merit will receive new knights of agriculture each year in ever increasing numbers."

This expectation has been magnificently fulfilled. The competitions of 1916-1917, 1918, 1919 and 1920 have testified to a revival of agriculture. During this period 361 competitors have been proclaimed Laureates, as compared with 153 during the previous cycle.

The Quebec Provincial Fair has had its share in this remarkable progress. Through its annual demonstrations in honour of old laureates and of new ones, it has created great rivalry among the agricultural class, and has made known the importance of the work of the farmer.

In 1916 an official flag of the order was inaugurated by the management of the fair, and a special and solemn song was consecrated, "*O Laboureur, artisan des sillons!*"

In 1917 a member of the Catholic clergy, Reverend Louis F. Côté, of St. Alexis de Matapedia, was among the most distinguished competitors.

In 1918 the name of a minister of the Crown, the Honourable J. A. Tessier, the present Minister of Highways, appeared on the list of competitors for the silver medal. In the same year, among the competitors for the silver medal were the names of two worthy Canadian women, Madame Jos. Lamy, of Yamachiche, St. Maurice county, and Madame Eugène Bernier, of St. Stanislas, Champlain county. And since 1915, the celebrations at the Provincial Fair of Quebec have been notable for distinction and significance.

Competition of 1920

The inspection of the 49 farms entered in the competition of 1920 was undertaken by Messrs. Thomas Drysdale, Jos. Deland, Arsène Denis, who have been judges of Agricultural Merit, since 1897. The secretary of the judges is Mr. J. A. Marsan, who has been in charge of this work since 1900. Men of no greater learning or experience could be found. No one could deny the efficiency of this jury, and their decisions, based on the strictest impartiality, has never been protested.

All the competitors in the contest of 1920 were distributed in the counties of the first division of the sixth cycle. They were as follows:—

Argenteuil, 5; Beauharnois, 4; Châteauguay, 4; Deux-Montagnes, 16; Hochelaga, 1; Huntingdon, 3; Jacques-Cartier, 2; Laprairie, 2; Laval, 2; Napierville, 3; Soulanges, 1; Terrebonne, 1; Vaudreuil, 4; total, 49.

The judges who decide on the merits of the competitors are appointed by the minister and chosen among the laureates, who have received the degree of distinguished merit or of exceptionally distinguished merit, or among the professors of agricultural colleges.

The judges ascertain, first, those who get the most from their land without exhausting the same and with the least expenditure, in comparison with the net

returns. Merit, work, and not wealth, are rewarded.

A diploma and a silver medal are granted to those who receive the degree of *very high merit*. At least 85 marks out of 100 marks are allowed for perfection. A diploma and a bronze medal are granted for the degree of *great merit*—that is at least 75 marks out of 100. A diploma for the degree of *merit*—that is at least 65 marks out of 100.

For the purposes of this contest, the province is divided into five agricultural districts, and the competition is held each year, beginning by district No. 1 and finishing by district No. 5.

The first district includes the following counties: Argenteuil, Beauharnois, Châteauguay, Deux-Montagnes, Hochelaga, Huntingdon, Jacques-Cartier, Laprairie, Laval, Napierville, Soulanges, Terrebonne and Vaudreuil.

The second district includes the counties of Bagot, Brome, Chambly, Compton, Drummond, Iberville, Missisquoi, Richelieu, Richmond, Rouville, Shefford, Sherbrooke, Stanstead, St. Hyacinthe, St. Jean, Verchères and Yamaska.

The third district includes the counties of Arthabaska, Beauce, Bellechasse, Bonaventure, Dorchester, Frontenac, Gaspé, Îles-de-la-Madeleine, Kamouraska, Lévis, l'Islet, Lotbinière, Matane, Mégantic, Montmagny, Nicolet, Rimouski, Témiscouata, Wolfe.

The fourth district includes the counties of Berthier, Champlain, Joliette, Labelle, L'Assomption, Maskinongé, Montcalm, Pontiac, St. Maurice, Trois-Rivières, and Wright.

The fifth district includes the counties of Charlevoix, Chicoutimi, Lac St. Jean, Montmorency, Portneuf, Quebec, and Saguenay.

Competitors

All those who have observed the conditions specified in the Act and by Regulations in Council are eligible.

THE AGRICULTURAL GAZETTE OF CANADA

In each case the competitor must work, either as owner, farmer or lessee, a farm of which at least fifty acres are under cultivation, either in field crops, pasture, garden, vegetables, orchard, small fruits, etc.

Entries must be made before May 1 of each year by the competitors, on forms sent out by the Department of Agriculture. The form contains a number of questions for the information of the judges, which competitors are requested to answer. Entries must be forwarded to the Secretary of the Agriculture Council on or before June 1, and no entry can be accepted after that date.

The decision of the judges must be based upon the merit of the system of farming, no matter what may be the quality of the soil or the kind of crops grown, or the system of improvement. They must find out to what extent the competitor may have served as an example to the community by the way in which he works his farm.

In judging buildings, the judges must begin with the farm residence, its situation, drainage, ventilation, water supply, etc. Not only the barns, stables, pig sties, sheep folds, etc., must be carefully inspected, but special attention must also be given to the dairy, ice house, poultry house, etc. In this examination, as well as in the examination of agricultural implements and tools, judges must take special notice of any improvement or innovation, and give a description of the same in their report. They may, at their discretion, grant a certain number of marks, in proportion to the importance of such improvements, which marks are taken from the rest of the marks yet to be granted.

In scoring, the judges must take into consideration not only the field crops and the major operations but also all

minor industries such as cheese and butter-making, poultry, bees, and domestic products, and consider if these special lines are adapted to the conditions in which the competitor is placed and are of such a nature as to give him a profit.

The judges must make sure that everything they are called upon to inspect, such as land, cattle, and farm implements, really belongs to the farm, and forms part of its stock and equipment.

When judges notice gross neglect on the part of a competitor as regards the destruction of weeds, not only must they not allow any of the marks provided for that item, but they must deduct a certain number of marks, not exceeding five, from the total allowed on other subjects, and make special mention of the same in their report.

The competitor must show what improvements he has made, especially during the previous year. He must give specific information as to his rotations, the care he gives to the selection of seed, the manner in which he cares for his meadows, the fertilizers applied, the arrangements he had made, keeping and utilizing manure, the depth of ploughing, his drainage system, his manner of managing pig sties in winter as well as in summer, his manner of feeding his pigs, cows, sheep, and other live stock.

Competitors are requested to include with this information a small plan of the land which they desire to enter, showing the divisions, the size of each division, the location of the buildings, streams, ditches, etc. It is not expected that this plan should be as exact as a surveyor's plan; all that is required is a sketch such as any intelligent farmer could make or have made by his family or with the help of his neighbours.

EXTENSION WORK OF THE COLLEGE OF AGRICULTURE, UNIVERSITY OF BRITISH COLUMBIA

General Progress

FOR the first time in the past three years the College of Agriculture of the University of British Columbia has opened with a full staff in all departments. Recent progress also includes the completion of the organization of the extension service. At the University Farm, Point Grey, a further area of land has been cleared. An additional one hundred acres were cut over and burned under the relief scheme last winter. A small but serviceable agronomy barn for storage purposes has been made ready for use, and a general extension has been made in all branches of the work. Through the courtesy of the provincial government, seven Clydesdale mares, Nerissa, Peggy Pride, Opal, Colony Opal, Melita Dunure, Colony Baroness and Lady Begg, have been transferred from Colony Farm, Essondale, to the University Farm for instructional purposes. Four foals by Baron's Best were added to the group this year. The college may now be considered to have reached a certain degree of maturity in that the first graduates—eight in number—received in May this year the degree of Bachelor of Science in Agriculture.

Organization of Extension Work

The extension work of the College of Agriculture may be divided into two divisions: (1) Extension teaching; (2) Extension investigation.

(1) The Extension teaching is in the nature of Extension Schools of not less than four days' duration offered in such sections of the province as apply for them. The work offered is planned to

meet the requirements of the district, and an attempt is made to deal with basic principles that are broadly educational rather than to offer work in the nature of practise schools, such as box packing, pruning, or similar problems. (This latter is in the hands of the Department of Agriculture, and is performed through the District Representatives). In addition, field meetings may be held to discuss results of experiments conducted by the extension division.

(2) The Extension investigation is organized by projects and comprises:

(a) An economic study of the Dairy Industry including farm incomes, and a study of the factors influencing farm incomes and cost of production on the farms included in the survey.

(b) An economic study of the Tree Fruit industry including the problems indicated above for dairying, but in addition a study of variety yields at different ages as a basis to a study of the variety problem.

(c) An economic study of the Poultry Industry along the lines indicated for Dairying.

(d) A bacteriological study of the factors influencing the grade and quality of milk, cream, butter and cheese. This work is being carried from farm to creamery or dairy or city milk depot.

(e) (1) An experimental study of the effect of various fertilizers on farm crops under the varied conditions in the province.

(2) An experimental study of various grass mixtures for hay and pasture purposes. These tests are being carried out on farms which are widely scattered throughout the province.

FIELD HUSBANDRY EXPERIMENTS IN RELATION TO FARMING

BY MANLEY CHAMPLIN, PROFESSOR OF FIELD HUSBANDRY, COLLEGE OF AGRICULTURE, UNIVERSITY OF SASKATCHEWAN

FIELD Husbandry Experiments have a very direct relationship with practical farming whether the farming be grain growing, stock growing or both combined. The grain grower requires the best seed obtainable of the best varieties of wheat, oats, barley and rye. We endeavour to determine which are the best varieties and then to breed better ones and put the seed out to people who will increase it and make it available for all. The stock grower requires feed. We endeavour to serve him by determining the best kinds of forage crops and the best methods of producing them. The grower of both grain and livestock is interested in both these phases of experimental work and also in crop rotation and soil fertility. The potato and truck grower is anxious to secure the best standard varieties and to learn how to grow them to the best advantage. Our field husbandry experiments at Saskatoon are designed to serve all these classes of farms, the grain farm, the livestock farm, the diversified farm and the truck farm. If we may liken the work of the field husbandry department to the structure of a building, we would consider the experimental work as the foundation, the class room teaching as the building itself and the extension work, including correspondence and outside teaching as the towers, porches and cupolas. In short, the experimental work is the basis upon which rests all of the other activities of the department.

Division of Experimental Work

There are four fundamental problems that confront every farmer, which come within the confines of this department. The first is the question as to what is the best variety of wheat, of oats, of

barley and of other crops and whether there isn't something better than we have at present. To help in solving this problem we have plant breeding projects with each of the important cereals and with sweet clover and alfalfa, as well as almost innumerable variety and strain tests to determine what is best among the varieties already developed.

The second question relates to the rotation of crops. There is little question but that God intended crops to co-operate. He provided some with numerous small fibrous roots and others with long branching tap roots. He ordained that some crops may be sown broadcast and that others must be sown in rows and cultivated. The very nature of these crops indicates that they were intended to help each other. It is the purpose of our crop rotation experiments to find out the various means by which the crops can be rotated so as to co-operate and thus help one another.

The third question has to do with the production of feed or forage crops. Our experimental work in forage crops is designed not only with a view to finding out what kinds of grasses, corn, sunflowers, roots, and clovers are adapted to our use but also to learn the best methods of planting and growing the crops. There is almost an untrodden field ahead of us in this direction.

The fourth great fundamental problem relates to farm management with a view to maintaining soil fertility. At first thought we might consider this problem as absolutely hopeless. When we consider that every freight train that leaves the province loaded with grain carries with it the vital plant foods, nitrates, phosphates, potash, etc., we might conclude that our case is hopeless. But when we consider the great soil improving qualities of certain

plants such as clover and alfalfa and the magnificent prospects of the livestock and dairying industry, which manufactures its own fertilizers, we become more hopeful. Our experiments started this year in co-operation with the newly established soils department are designed to determine ways and means by which the soil may be maintained in something like its original state of fertility.

The problems of tillage have been pretty well worked out. Since the days of Jethro Tull, experiments relating to tillage and cultivation have given much the same conclusions. We know that we must plough thoroughly and vary the depth somewhat according to the crop to be grown. We know that for cereals and grasses, the seed bed must be firm. We know that cultivation should be sufficient to keep down the weeds, and that the object of our surface tillage must be to keep the soil receptive to moisture. These facts are well established. For that reason, we are not carrying on any tillage experiments at the present time. Something had to be left out, and it seemed to us that the tillage questions were nearest to solution of any. Thus briefly, our field husbandry experimental work includes: plant breeding, variety testing, crop rotation, methods of growing the crop, both cereals, forage and truck, and methods of maintaining soil fertility.

Products of an Experiment Station

The products of an experiment station consist of two things: The first is record of results. The second is seeds. Every care is used in maintaining the accuracy of the records and the purity of the seeds. Special bookkeeping methods are devised and used for the purpose of recording the results. Since there are now 5,000 separate and distinct items, it will be readily understood that this is no small task. We are constantly endeavouring to improve our system of

record keeping to make it more effective and complete.

The seeds which we distribute are not only rigidly fanned and cleaned but are hand picked if need be to take out any impurity that the fanning mill fails to remove. Every lot of cereal seed sent out during the past season had been hand picked. On account of the large number of strains and varieties which we are growing, the greatest care is required to keep seeds pure. In short, it is almost impossible to do so. But we put these seeds out under a rigid guarantee that they must be satisfactory or that they may be returned and the purchase price will be refunded. This year not a seed came back. This record speaks volumes for the faithfulness and care of the men who did the work.

A Survey of 'the Experimental Plots

The experimental field is surveyed into 15 strips or series each eight rods in width. These are separated by roads 20 feet wide. The series are subdivided into blocks containing about 1.2 acres with 20 foot roads separating them. This gives a total of 110 blocks of a little over one acre each. Entering the main gate will be found, to the right, alfalfa introductions from all parts of the world. On the left is seen the alfalfa breeding work where hundreds of plant progeny are being tested. Proceeding southward, the blocks growing special selections of wheat and yellow sweet clover are observed. As we go on through we find variety tests with corn, tests of various mixtures for hay, sunflower, and potato experiments, ten blocks devoted to soil fertility tests with most of the important crops and winter rye tests over to the right. Soon we come to the pure seed production fields of Grimm alfalfa and brome grass. Nearby we find the grain breeding and testing plots and as we circle back to the north we see the elaborate set of crop rotation trials wherein over a hundred different crop rotation schemes are in progress. This

brief survey will indicate how the work is done, how the tests are made, and all will agree that each of these 5,000 ex-

perimental units has a direct bearing upon the success of agriculture in this province.

POULTRY HUSBANDRY DEPARTMENT OF MACDONALD COLLEGE

BY M. A. JULL, PROFESSOR OF POULTRY HUSBANDRY

THE primary function of the Poultry Husbandry Department of Macdonald College is teaching. Since teaching divorced from experimental and research work is barren, therefore the department aims to carry on a few lines of experimental work. Since teaching is impossible without students, some kind of extension work becomes necessary; therefore the department endeavours to keep in touch with the young men of the country districts through various lines of extension work. Since all these lines of work necessitate the keeping of a fairly large number of birds on the plant, a certain amount of commercial work naturally follows. Briefly then, the department is conducting four lines of work, namely—Instructional—Experimental—Extension—and Commercial.

Instructional Work

The teaching of Poultry Husbandry at Macdonald College involves a four year course of instruction to B.S.A. students, a practical course of instruction to the Winter Course students and instruction in a Poultry Short Course. The first and last courses are practically the same as given at other institutions. In regard to the instruction given to the winter course, however, a plan different from usual is followed. The boys enter the course about the first of November and all of the poultry instruction given in the first term is concentrated in the first three weeks after their arrival. This enables the Poultry department to provide for practical work in the production and preparation of poultry pro-

ducts for market, undertaken by the students in conjunction with the lecture courses. The same plan is followed in the second term in which case all the poultry lectures are given in the last five weeks of the term, from the early part of February to the middle of March, and the students are given practical work in incubation and brooding.

Experimental Work

The breeding work, involving the development of laying strains of Barred Plymouth Rocks, S. C. Rhode Island Reds, White Wyandottes and White Leghorns has been continued. Detailed records were continued regarding fertility, hatchability, livability, and progeny production. A large number of pedigree breeders were distributed, and as the work progresses there should be available for farmers, larger and larger numbers of high class male breeders from heavy laying strains. Continued and wider distribution of such breeders should do much toward improving egg production on the farms.

Yearly records were continued on determining the amount and cost of feed to produce one dozen eggs in Plymouth Rock and Rhode Island Red pullets and yearlings. The continuation of this work for two or three more years will provide us with considerable information of value to the farming community.

Experimental work in the fattening of roasters was continued, the chief factors under consideration being the determination of the optimum weight for fattening; the relative rates of increase in flesh production in a ten-day, two-week

and three-week feeding period; the efficiency of various fattening rations, with special reference to the use of beef scrap as a substitute for skim milk; dressing percentages of roasters. It was found that the optimum weight for fattening was about 3.5 pounds with Barred Plymouth Rocks and Rhode Island Reds. With large birds the ten-day period was found most profitable, but with birds weighing about 3.5 pounds each, the two-week period was the most profitable; although it should be pointed out that where the farmers can get top prices for well-finished roasters, the three-week period is advisable, because of the superior finish, in spite of the higher cost of production. A ration containing ten per cent beef scraps was found most profitable for 3.5 pound birds on a two-week feeding period, the average gain in live weight being 1.101 pounds per bird. The average number of pounds of ration required to produce one pound gain in live weight was 7.318 pounds. The average percentage of the ration retained as gain in live weight was 14.411 per cent. The average dressing percentage to the live fattened weight was 89.354 per cent and to the initial live weight 120.867 per cent.

An experiment was conducted to determine the edible portion of roasters, the drawn weight was found to be 80 per cent of the live fattened weight and 82 per cent of the dressed weight. The edible portion was found to be 61 per cent of the live fattened weight, 67 per cent of the dressed weight, and 77 per cent of the drawn weight. The cooked body flesh was found to be 35 per cent of the live fattened weight, 39 per cent of the dressed weight, 49 per cent of the drawn weight, and 66 per cent of the cooked drawn weight.

The experiment in determining the amount of food required to produce one pound of flesh in raising Pekin ducks was continued, as was also the experiment in determining the rate of growth during the first eight weeks. As com-

pared with previous years when an average of 3.073 pounds of food were required to produce one pound of duck flesh, last year, 4.406 pounds of food were required. The results of previous experiments gave an average weekly weight per duck, for the first eight weeks of .103, .166, .353, .519, .876, 1.564, 2.153, 2.851, and 3.712 pounds while the results last year were: .132, .143, .227, .311, .606, 1.030, 1.626, 2.180, and 2.591 pounds.

During the past year work was conducted on the following problems: egg weight as a criterion of production, seasonal variation in the weight of eggs, seasonal variation in weight of yolk and albumen in relation to the total weight of egg, inheritance of weight in eggs, proportion of sexes hatched in relation to egg production, proportion of sexes in crossing work, proportion of sexes at various seasons of the year, rate of growth in male and female Barred Plymouth Rock chicks.

Extension Work

The extension work involves much that is common to other institutions and involves the distribution of literature, the giving of lectures and demonstrations at farmer's meetings, the judging of poultry at agricultural fairs and poultry shows, and assisting local poultry associations in various ways. The most important lines of extension work involve demonstrations in culling the laying flock and in fattening and killing poultry for market. These are two important lines of extension work which will demonstrate to the farmer the possibility of making his flock much more profitable.

Commercial Work

Between 1,200 and 1,500 layers are kept annually, the great majority of these being bred-to-lay birds. It is not possible to operate the poultry plant on a strictly commercial basis inasmuch as considerable expense is involved in

providing teaching material and giving demonstrations. Experimental work also interferes with operating the plant from a strictly commercial standpoint. Nevertheless we are able to make a satisfactory showing and the experience gained enables us to give much more effective instruction in poultry economics. Results so far have shown that it is quite probable that the most

efficient ways of developing the farm poultry industry constitute the purchase of incubators and brooders on the part of the average farmer, otherwise it is highly probable that the near future will see government hatcheries and brooderies established and farmers purchasing partially developed bred-to-lay pullets obtained from eggs supplied by officially controlled breeding plants.

BETTER SIRES FOR SASKATCHEWAN HERDS

Progress of the Campaign against the Scrub Bull

BY J. H. ROSS, SASKATCHEWAN LIVE STOCK BRANCH

THE first organized effort for live stock improvement in Saskatchewan was started in 1909 by the organization of the Saskatchewan Cattle Breeders' Association. This association of the prominent stockmen of the province has done very effective work by encouraging the breeding of better live stock and the holding of annual sales of pure bred stock. Through the co-operation of the association and the Live Stock Branch, annual sales are held at Regina, Prince Albert and Saskatoon. During 1921 approximately five hundred and fifty head of pure bred stock were offered for sale. A large percentage of these pure bred sires went to herds formerly headed by scrub sires.

In order to assist farmers who were not in a position to purchase pure bred sires, the Department of Agriculture in 1913 passed *The Live Stock Purchase and Sale Act*, whereby bona fide Saskatchewan farmers can purchase pure bred sires on one-half or one-quarter cash basis, the balance payable in two notes, the first due at the end of the current year, and the second due the end of the next succeeding year; interest at 6 per cent. To date, over 1,000 pure bred sires have been supplied, which means the elimination of at least an equal number of scrub sires. The Act

referred to was the medium through which many prominent breeders obtained their first pure bred sire.

During the present year it was realized that a more concentrated effort should be devoted to the improvement of the live stock in the province by an endeavour to eliminate the scrub sire. This "Better Bull Campaign" was carried on through the co-operation of the Saskatchewan Cattle Breeders' Association, the Live Stock Branch and the Dominion Department of Agriculture. It was felt that the time was not ripe to pass laws prohibiting the use of scrub sires, and it was therefore decided to conduct the campaign along educational lines, and demonstrate the importance of having a good pure bred sire in every herd.

The programme for 1921 was carried out by getting the names of as many owners of scrub bulls as possible and placing their names on our mailing list; obtaining a list of a large number of breeders having pure bred bulls for sale, and mailing a circular giving particulars regarding breed, name and number of bull; age, weight, colour, and price, to owners of scrub bulls, secretaries of rural municipalities, etc. With the aid of the information given in this circular, farmers were enabled to exchange aged

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bulls or purchase young bulls direct from the breeder.

Monthly bank bulletins were also published, showing the advantage of using a pure-bred sire, and announcing important live stock events such as the Association bull sales. A number of circulars were printed, showing the necessity of using better sires, and stating how same could be purchased on easy terms through the Saskatchewan Department of Agriculture or loaned to farmers' clubs by the Dominion Department of Agriculture. This literature was distributed to all banks in the province, secretaries of rural municipalities, members of the Cattle Breeders' Association, and owners of scrub bulls.

Through the co-operation of the Department of Agriculture and the Canadian Pacific Railway Company, a "Better Bull Special" was run in conjunction with the Dairy and Field Crops cars in the southeastern part of the province. This train carried representative sires of all the leading breeds, as Shorthorn, Hereford, Angus, Holstein and Ayrshire. These bulls were sold for cash or on credit terms, or exchanged with farmers for pure bred sires. Scrub sires were purchased at market prices, and the amount credited as cash payment on pure bred sires purchased in exchange. Considering the unfavourable live stock market situation, and the inferior crops obtained for several years in the southeastern part of the province, the enterprise may be looked upon as a decided success. Twenty-one different towns were visited, and twenty-four meetings held, with an attendance of approximately five thousand people. At each meeting the live stock representative in charge gave an address regarding types and breeds of farm animals, and the necessity for using better sires. In all, twenty-one pure bred bulls were placed, five pure bred bulls were ex-

changed, and several scrubs were purchased and replaced with pure bred.

This year an exhibit of pure bred bulls and butcher steers was sent to all the larger fairs in the province. The car of pure bred sires had representatives of all the leading breeds. They were sold to farmers for cash or on credit terms. Quite a number were sold on the circuit. The car of butcher steers consisted of twelve head, classified as export, butcher, feeder and common steers. Each group had a representative of Shorthorn, Hereford and Angus breeding. These steers were purchased at the Winnipeg Stock Yards. The export steers averaged 1,363 pounds and cost \$117.45 per head; the butcher steers averaged 1,200 pounds and cost \$94.05; the feeders averaged 956 pounds and cost \$52.95; while the common steers weighed 574 pounds and cost \$18.97. This exhibit was an object lesson to farmers, showing the advantage gained by using good, pure bred sires. The export and butcher steers showed good breeding, and were the kind that always pay their way, while the common steers showed mixed breeding, were under size, of poor conformation—the kind that are fed at a loss.

A motion picture film is being produced in connection with the campaign. This film will show the results obtained by farmers in Saskatchewan from crossing the ordinary grade females with pure bred sires of the leading beef and dairy breeds. This film will be used in connection with short course work during the winter months.

Work in connection with the campaign was considerably handicapped during the present season by the extremely heavy drop in the price of butcher cattle. Notwithstanding the various handicaps our work was quite successful, and we hope that by united effort we can extend considerably the work of the "Better Bull Campaign" next year.

ALBERTA POTATO GROWERS ORGANIZE

BY J. H. HARE, POULTRY COMMISSIONER

THE commercial potato growers of central Alberta in co-operation with the provincial department of Agriculture have recently undertaken a reorganization of the potato industry. A beginning has been made in the Edmonton district where the Edmonton Potato Growers' Co-operative Association has been formed. It has been apparent for some time that the potato business in Alberta has suffered from a lack of organization and the application of proper methods in marketing. In the spring of 1920 action was taken by the Department of Agriculture and the more progressive growers which resulted in the formation of a general improvement association called the Edmonton District Potato Growers' Association. While this association was not equipped to market the crop co-operatively a considerable amount of good was done, through it, in standardizing methods, in extending the practice of grading, in limiting the varieties grown and in spreading information as to better methods of culture and disease control. In this educational work the Field Husbandry Department of the Alberta University co-operated and rendered invaluable service to the growers.

At the conclusion of these early efforts it was felt that something should be done to organize the marketing. It was agreed that the problem of greatest urgency was the problem of marketing and that if the conditions warranted, a co-operative marketing association should be formed. With this in mind the growers approached the Department of Agriculture and asked for assistance. In response the Minister of Agriculture commissioned an officer of the department to secure the necessary information for the guidance of the growers and to make a personal investigation of the potato marketing organizations in the states of Michigan and Minnesota.

This was done in the month of June, 1921. In July a report was made to the growers and on a basis of this report and accompanying recommendations the Edmonton Potato Growers, Limited, was formed.

This association is purely co-operative in form and is patterned after the more successful types of co-operative associations in Canada and the United States. The objects of the association are to encourage better and more economical methods of production and to secure better results in grading, packing, advertising, and marketing the potato crop. The shares of the association have a par value of \$25. The association takes the share form of organization in order to conform to the requirements of the Alberta Co-operative Societies Act under which it is incorporated.

The membership is limited to producers of potatoes living in the territory tributary to the business office of the association. A grower on becoming a member is required to purchase at least one, but not more than ten shares, paying in cash 20 per cent of the par value. He must also sign a negotiable non-interest-bearing demand note for two hundred dollars (\$200) which is made out to the order of the association. These notes are used as collateral security with which to borrow funds in financing the various operations in connection with the marketing of the crop. It is a simple yet effective system of financing and means, simply, that each member loans the association two hundred dollars of his credit. With the membership at 47, where it stood on September 20, the association had established a credit with the bank on the strength of these notes alone of \$9,400. The notes are the property of the association and are available in the settlement of any liquidation damages which may result from

the failure of any member to live up to his contract with the association.

The Crop Contract

In addition to the above the incoming member is required to enter into a contract with the association respecting the handling and marketing of his crop. This contract specifies, among other things, that the grower appoints the association his agent for the purpose of handling and marketing his potatoes, and he binds himself to deliver to the association his entire crop. The period of the contract extends indefinitely but provides that a grower wishing to withdraw from the association may cancel his contract at the end of any crop year upon giving thirty days notice. The contract includes a penalty clause which provides that if the grower fails or refuses to deliver his crop to the association he shall pay to the association, as liquidated damages, an amount equal to the service charge of the association which charge, this year, is fifty dollars per car, an amount equivalent to approximately eight cents per bushel. This amount may be deducted from any money in the possession of the association due the offending grower or may be a charge against the grower's note.

With regard to tempting outside offers, the contract provides that if a member is offered by some outside concern a price in excess of the price then obtainable by the association, he shall turn over such offer to the association to be filled by it from said growers' potatoes. This clause is meant to nullify the efforts of opposing concerns in any effort to discredit the association by paying temporarily more than the market will allow.

The Pooling System

The marketing scheme includes an arrangement by which sales shall be pooled. The length of the pooling period and other details in connection

are matters which are left with the board of directors. The contract does not stipulate that the member must accept the pooling arrangement; any grower may have a separate account if he so desires, but the board recommends that members accept the arrangement and enter the pool. There has been no opposition thus far, in fact, the general sentiment seems to be strongly in favour of the pooling arrangement. The directors of the association decided upon a semi-weekly pool for the early crop and a weekly pool for the late crop. The semi-weekly pool period running from July 1 to August 15 and the weekly pool for the remainder of the year. Seed and fancy grades of potatoes are not included in the pool, and f.o.b. sales and "rollers" are treated separately; otherwise the regulation provides that the returns for all shipments of like variety and grade are to be pooled. There is a feeling among the growers that the pooling period will eventually be lengthened, the longer period being thought to conform more nearly to the ideals of co-operation.

Grading and Inspection

It is the determined policy of the association to grade all shipments, adopting the grades recommended by the Dominion Fruit Commissioner.

There are three grades in the standard adopted, Canada A, Canada B and Canada C.

"Canada A shall consist of sound, reasonably mature potatoes, of similar varietal characteristics, which are practically free from dirt or other foreign matter, frost injury, sunburn, abnormal growth, growth cracks, cuts, scab, blight, soft rot, and damage caused by disease, insects or mechanical or other means.

"The diameter of potatoes of the round varieties shall not be less than one and seven-eighths ($1\frac{7}{8}$) inches, and of potatoes of the long varieties, one and three-fourths ($1\frac{3}{4}$) inches, provided that

not over twenty per cent (20%) by weight of any lot shall be less than two and one-quarter ($2\frac{1}{4}$) inches in diameter.

"In order to allow for variations incident to commercial grading and handling, five per cent by weight of any lot may be under the prescribed size, and in addition, six per cent by weight of any such lot may be below the remaining requirements of this grade; but not more than one-third of such six per cent, that is to say, not more than two per cent by weight of the entire lot, may have the flesh injured by soft rot.

"Canada B grade shall consist of reasonably mature potatoes of similar varietal characteristics, which are practically free from dirt or other foreign matter, frost injury, and soft rot, and which are free from serious damage caused by sunburn, cuts, scab, blight, dry rot, or other disease, insects or mechanical or other means.

"The diameter of potatoes of this grade shall be not less than one and one-half ($1\frac{1}{2}$) inches, but not over twenty per cent by weight of any lot of the specified minimum size ($1\frac{1}{2}$ inches) may be included.

"In order to allow for variations incident to commercial grading and handling, five per cent by weight of any lot may be under the prescribed size, and, in addition, six per cent, that is to say, not more than two per cent by weight of the entire lot, may have the flesh injured by soft rot.

"Canada C grade shall consist of potatoes which shall be not less than one and one-half ($1\frac{1}{2}$) inches in diameter."

Alberta has suffered considerably, in the past, as a consequence of misrepresentations and through not having a systematic grading policy. It is the purpose of the association to correct this condition, at least so far as the shipments of the association are concerned. The brand of the association will be carefully guarded and every effort will be made to win the confidence

of the trade and establish a reputation for reliability of pack. All cars are being inspected before shipment by a potato expert who is in the employ of the association. This inspector has the power to reject cars and require re-grading when necessary.

Over one thousand acres of potatoes are being grown by the members now in the association, and the season's shipments will probably total 300 or more cars.

Association Agreement

THIS AGREEMENT, made and entered into at Edmonton on this.....day of.....A.D. 192..., between the EDMONTON POTATO GROWERS' LIMITED, formed under the laws of Province of Alberta, having its principal place of business at Edmonton, in the said Province (hereinafter referred to as the Association), and.....a member of said Association, of.....in the Province of Alberta (hereinafter referred to as the Grower.)

WITNESSETH THAT for and in consideration of the outlays incurred and to be incurred by the Association in providing means and facilities for handling and marketing potatoes and other farm products, including the expense to which it has been put in finding and organizing and establishing markets, and in further consideration the mutual obligations of the respective parties hereto, it is hereby agreed as follows:

1. That the Grower appoints said Association his agent for the purpose of handling, grading and marketing all the marketable potatoes and other farm products such as.....
.....
.....grown by him, except what he may use for home consumption, for feed and seed, or sell in less than carload lots for local consumption and distribution. This shall be construed and accepted to mean that marketable potatoes must neither be sold nor delivered to individuals or concerns, who make a business of collecting and shipping potatoes or other farm produce by the carloads, and

That the Grower will deliver his marketable potatoes and other farm products, herein contracted, at the Association's shipping station at.....

in said Province, in such quantities and condition and at such times as the Association or its agent and the undersigned Grower may agree upon, during the life of this contract.

On or before July 1 of each year the Grower shall report to the Association the acreage to be grown by him that year, of potatoes and other farm products covered by this contract. If the Grower reports of vegetables, not specially mentioned above in this contract, such report shall be construed and accepted to indicate his intention to include such produce in his contract in the future, on the conditions and terms covered by this contract. During the growing season the Grower shall furnish such information concerning said potatoes and other farm products as may be requested by the Association.

2. That either party may cancel this contract on the first day of July of any year, after giving notice in writing to the other party of the intention to do so, such notice to be given at least thirty (30) days prior to said date. Upon such notice, the Grower shall, prior to said first day of July, pay any indebtedness then due from him to the Association, and deliver his copy of said contract to said Association, and the same shall thereupon be cancelled; but such cancellation shall not affect any incompleated sales or transactions between the parties hereto, nor release either from any indebtedness then unpaid or thereafter accruing under this contract, nor release the Grower from his obligation to sell through the Association, nor the Association from its obligation to handle all the potatoes and other farm products described in Section 1, which were grown during the preceding season.

3. The harvesting, grading, inspecting, storing and shipping of the potatoes and other farm products shall be done in accordance with the by-laws and rules of the Association now in existence or hereafter in effect.

4. That all potatoes and other farm products delivered by the Grower may be marketed in assorted lots or with other potatoes and farm products of like character and the proceeds of any or all shipments may be prorated with the proceeds of any other potatoes and other farm products of like variety and grade marketed by the Association, during such periods as the Board of Directors from time to time may determine. Provided that nothing in this paragraph, nor elsewhere in this contract shall be construed to deny or

abridge the right of the Grower to deliver to the Association, for sale on separate account any potatoes or other farm products that said Grower may elect to withhold from the above provided for pooling arrangements.

5. That the Association shall have a lien upon the potatoes and other farm products hereby contracted by the Grower to be delivered to the Association, for any indebtedness of any kind owing by him to the Association, and any such indebtedness shall be deducted out of the net proceeds of the sale of such potatoes and other farm products.

6. That the Grower will not sell or otherwise dispose of his potatoes and other farm products covered by his contract (see also section 1) to any purchaser except through the Association, unless such potatoes and other farm products be rejected by the Association. In case the Grower is offered a price in excess of the price then obtainable by the Association, he shall turn over such offer to the Association to be filled by it from said Grower's potatoes or other farm products covered by this contract.

7. That the potatoes and other farm products covered by this contract shall be marketed by the Association wherever a market may be found which in its judgment, and in accordance with its by-laws and rules shall justify such marketing. The Association shall not be liable for any damage that may be sustained through act of God or public enemy, or accidents in shipment or storage, or unavoidable failure to secure suitable storage or markets for the proper handling and storing and marketing of said potatoes and other farm products. Any loss to any shipment occasioned by a Grower through improper packing, grading or otherwise shall be borne by said Grower.

8. That the Grower will pay the Association its regular charges for its services, including handling, storing, shipping and marketing, which charges are to be fixed by the Board of Directors of the Association, and which shall be in amount sufficient to pay all expenses of rendering such services, including the overhead expenses of the Association. The Grower gives the Association the right to deduct the amount necessary to cover such charges from the returns received for his potatoes and other farm products paying him the balance.

9. That in case the Grower shall at any time fail to fulfil any of his obligations under the provisions of this contract, including the failure to deliver

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the said potatoes and other farm products to the Association as hereinbefore provided, any claims arising from such failure to meet his obligation, shall be a charge against the Grower's note given by him to the Association in accordance with its by-laws, and

That if the Grower fails or refuses to deliver to the Association, for marketing and distributing, the potatoes and other farm products required by this contract, he shall pay to the Association, as liquidated damages, an amount equal to the service charges of the Association as determined under the provisions of Paragraph 8, for each cwt. of potatoes and other farm products not so delivered. Said sum may be deducted from any money in the possession of the

Association due the Grower, and shall also be a charge against the Grower's note as above provided.

10. That in case the manager at any time should meet with unforeseen difficulties in the marketing, he may authorize the Grower to sell in his own initiative. This clause may be revoked at any time by a vote of the Board of Directors.

In witness whereof the said parties have executed this contract in duplicate this day of 192 .

EDMONTON POTATO GROWERS,
LIMITED,

By.....President.

By.....Secretary.

.....Grower.

PROVINCIAL AGRICULTURAL LEGISLATION, 1921

Synopsis of Acts Relating to Agriculture—Appropriations for Agriculture

MANITOBA

An Act to Amend the Co-operative Associations Act: The amendments to the Co-operative Associations Act, 1916,—

- (a) Make possible the establishment of "locals"; that is, groups of shareholders of an Association organized for the purpose of doing local business.
- (b) Provision is made that an Association selling goods by wholesale may grant credit.
- (c) The directors may pledge the credit of the association, but no bonds, debentures or similar securities shall be issued.
- (d) All co-operative associations carrying on business in the province are required to come under the Act.

An Act to Amend the Dairy Act, 1915:

- (a) The amendments call for the subscribing of eight thousand,

instead of four thousand, dollars worth of shares before incorporation of an Association for manufacturing dairy products.

- (b) The limit as to the value of shares which any member may hold is altered.
- (c) Provision is made for licensing operators of milk and cream testing apparatus.
- (d) Provision is made for fixing grade standards and descriptions of milk and cream and for grading of these products.

An Act to Amend the Manitoba Farm Loans Act, 1917:

- (a) The share capital of the Manitoba Farm Loans Association is changed to \$550,000.
- (b) The rate of interest to be charged on loans is limited to seven per cent instead of to six per cent.

An Act to Amend the Home Economics Societies Act, 1916:

- (a) The name of these societies is changed to "Women's Institutes".
- (b) The Institutes are given power to hold property, etc.
- (c) Provision is made for dissolution of Institutes.

The Horticultural Societies Act:

This Act incorporates the Manitoba Horticultural and Forestry Association and provides for the organization of local horticultural societies and their affiliation with the Association. Regulation of the activities of the Association and local societies is provided for. Provision is made to pay provincial government grants of money equal to 60 per cent of the money actually paid out in prizes at horticultural exhibitions, as well as a further grant to local societies on the basis of membership fees paid.

The Noxious Weeds Act: Previous noxious weeds legislation being in need of consolidation, former legislation was repealed and a new Act substituted. In the new Act a reduction from five to four months is made in the length of time during which a municipality must annually engage a noxious weeds inspector. A form of oath for noxious weeds inspectors is now prescribed. In cases where action is taken to have weeds cut down, power is given inspectors to see that the weeds are also destroyed in order to prevent the spread of seeds. Instead of the Act being administered by a board of Commissioners, the matter is now in the hands of one weeds administrator. The power to levy a special tax against weed infested land, unless given weed eradication treatment, formerly vested in the Weeds Commission, is now transferred to the municipal council.

An Act to Amend the Rural Credits Act: The Act is amended to permit of money being loaned to cover one half the cost of erecting silos.

An Act to Enable Municipalities to Borrow Limited Amounts of Money for Seed Grain Purposes: A similar Act to this, passed year by year, provides annually for relief, through the municipalities, of persons requiring assistance in obtaining seed grain.

An Act to Amend the Sheep Protection Act: Under this Act the owner of sheep worried by dogs may, under certain conditions, recover partial damages from the municipality. By this amendment the length of time for filing notice of the loss is limited to 48 hours.

Agricultural and Community Districts Act: This Act is to permit of the erection of agricultural and community districts. These districts are bodies corporate and have power to provide community buildings and to acquire and equip grounds for agricultural or athletic purposes.

An Act to Authorize the Borrowing of Certain Moneys for the Purposes of Making Advances to the Brandon Winter Fair and Live Stock Association Limited: This Act is passed to permit of financial assistance being given to the corporation which holds the Brandon Winter Fair.

An Act to Amend the District Hail Insurance Act: The District Hail Insurance Act, 1920, provides for the establishment, upon favourable vote in thirty-five or more municipalities, of a Hail Insurance District. Such a district not yet having been established, the amending act of 1921 is intended still to permit of the establishment of such a district.

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AGRICULTURAL APPROPRIATIONS

	1919-20	1920-21
Salaries.. . . .	\$ 14,800	\$ 15,100
Supplies and Expenses.. . . .	2,500	2,500
Agriculture and Statistics.. . . .	199,670	197,920
Manitoba Agricultural College.. . . .	306,050	355,458
Immigration and Colonization.. . . .	20,000	20,000
Agricultural Publications.. . . .	23,500	23,500
Game Branch.. . . .	10,000	10,000
Miscellaneous and Unforeseen.. . . .	3,000	3,000
Birtle Demonstration Farm.. . . .	3,830	5,670
Settlers Animals Purchase Act.. . . .	9,140	9,320
Fire Relief.. . . .	.....	25,000
Supplementary.. . . .	65,438	138,400
	\$657,928	\$805,868

AGRICULTURAL INSTRUCTION GRANT, 1921-22 (FEDERAL)

1. Agricultural Representatives.. . . .	\$ 8,000 00
2. Dairy Work.. . . .	8,000 00
3. Poultry Work.. . . .	4,000 00
4. Boys' and Girls' Club.. . . .	16,000 00
5. Short Courses.. . . .	19,000 00
6. Women's Institutes and Home Economics.. . . .	15,000 00
7. Soil Analysis and Survey.. . . .	1,000 00
8. Beekeeping.. . . .	3,000 00
9. Killarney Demonstration Farm.. . . .	4,000 00
10. Contingencies and Miscellaneous.. . . .	1,113 11
Total.. . . .	\$79,113 11

SASKATCHEWAN

NO NEW Acts relating to Agriculture were passed by the Province of Saskatchewan in 1920. The amending Acts passed are for the most part of secondary importance. These amendments are entitled as follows:—

An Act to Amend The Agricultural Societies Act;

An Act to Amend The Agricultural Co-operative Associations Act;

An Act to Amend The Agricultural Aid Act;

An Act to Amend The Live Stock Inspection Act;

An Act to Amend The Horse Breeders' Act;

An Act to Amend The Stray Animals Act;

An Act to Amend The Saskatchewan Farm Loans Act;

An Act to Amend The Farm Implement Act: Under this amendment farm implements are defined as including traction and portable engines of a certain horse-power; power operated grain separators, engine ploughs and discs and all traction operated farm and road making machinery. Vendors are required to carry a sufficient stock of repair parts.

An Act to Amend The Dairy Products Act;

An Act to Amend The Egg Marketing Act.

AGRICULTURAL APPROPRIATIONS

	1920-21	1921-22
Assistance to General Agricultural Interests.. . . .	\$ 93,500	\$ 93,500
Assistance to Live Stock Industry.. . . .	189,200	42,100
Assistance to Dairy Industry.. . . .	22,000	21,000
Publicity and Statistics Work.. . . .	18,000	18,000
Improvement and Protection of Field Crops.. . . .	454,500	41,500
Game Protection and Museum.. . . .	27,300	37,300
Co-operation and Markets.. . . .	12,500	16,000
Film and Stereopticon Service..	12,000
	\$817,900	\$283,400

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DETAILS OF MAJOR SERVICES

	1920-21	1921-22
<i>Assistance to General Agricultural Interests—</i>		
Expenditure under Agricultural Societies Act.. . . .	\$ 80,000	\$ 85,000
Grants for Seed Improvement (to be recouped).. . . .	7,000	7,000
<i>Assistance to Live Stock Industry—</i>		
Administration of The Horse Breeders' Act.. . . .	9,000	12,000
General Services.. . . .	154,000	4,000
Saskatchewan Winter Fair Board.. . . .	8,000	10,000
Assistance to Saskatchewan Live Stock Association..	1,800	2,100
Destruction of Wolves.. . . .	6,000	1,000
<i>Assistance to Dairy Industry—</i>		
Administration of The Dairy Products Act and General Services.. . . .	13,000	12,000
For Advancement of Poultry Interests.. . . .	5,000	.....
For Promotion of Cow Testing.. . . .	.....	5,000
<i>Improvement and Protection of Field Crops—</i>		
Advancement and Methods for Control of Noxious Plants and Insects.. . . .	405,000	25,000
To promote the use of Improved Seed.. . . .	2,000	4,500
Gopher Destruction.. . . .	4,000	4,000
To provide Exhibits at Fairs.. . . .	5,000	5,000
<i>Co-operation and Markets—</i>		
Administration of The Agricultural Co-operative Associations Act.. . . .	3,000	2,500
To promote Co-operative Marketing of Farm Products..	5,000	8,000

AGRICULTURAL INSTRUCTION GRANT, 1921-22 (FEDERAL)

COLLEGE OF AGRICULTURE

1. Staff Salaries—Research and Extension Service.. . . .	\$19,209 49
2. Women's Work—Homemakers' Clubs.. . . .	7,500 00

INSTRUCTION AND DEMONSTRATION

3. Animal Husbandry.. . . .	8,000 00
4. Dairying.. . . .	6,000 00
5. Demonstration Trains.. . . .	9,000 00
6. Agricultural Representatives.. . . .	3,209 50
7. Veterinary Short Course.. . . .	500 00

ELEMENTARY AGRICULTURAL EDUCATION

8. Agricultural Instruction in Public, High and Normal Schools, Household Science, Training of Teachers, Nature Study.. . . .	20,709 49
9. Grants to Schools operating departments in Household Science.. . . .	3,000 00
10. Expenses of Officials at School Fairs.. . . .	3,000 00
11. Post Graduate Course in Agriculture, Agricultural Scholarships.. . . .	1,600 00
Total.. . . .	\$81,728 48

ALBERTA

An Act to Amend the Municipal Districts Seed Grain Act.—No advance shall be made after the first day of January 1921 except as follows: (a) Any municipal district may advance in respect to any quarter section for use in 1921 seed grain to the value of \$100 or less. (b) No advance shall be made which together with prior advances shall have effect of charging any quarter section with a greater sum than

\$900. (c) No advance shall be made to any person who is not the registered owner in fee simple of the quarter section in respect of which the advance is sought except with the consent of the registered owner.

The Secretary Treasurer shall take from every person to whom seed grain is supplied a demand note and a written agreement for a lien in form provided, in favour of the municipal district

upon all crops grown upon the lands mentioned in his application during the year in which the notice is given.

When a municipality files or has filed a lien in any year, such municipality shall in every year thereafter have a lien (a) Upon all crops grown from seed advanced (b) Upon the land named in the application except where the applicant is not the owner (c) Upon all crops grown upon the land named in the application except where the advance was made to a person who was not at the time of the advance the owner of the land and the land has ceased to be in the occupation or possession of such person.

It shall be the duty of the Secretary-Treasurer to enforce any lien if the amount due under the note be not paid prior to the 15th day of October of the year in which the note is given and the remedies provided by The Municipal Districts Act for the collection of taxes will apply.

In the event of monies advanced under the Act not being repaid before the 31st day of December next following the advance, the Municipal Districts shall, unless otherwise directed by the Minister, borrow an amount sufficient to repay the person, bank or corporation that made the advance and shall issue debenture or debentures to secure the same. Full directions are given as to the form, term and repayment of such debenture or debentures.

An Act Representing Advances for the Purchase of Feed for Assistance of Farmers and the Securities for Repayment thereof.—The Act contains the same provisions as that of 1920, the only difference being as to dates and that in 1921 not more than \$50 worth of goods shall be advanced to any one person.

The Seed Grain Act, 1921.—This Act contains the same provisions as that of 1920 the only difference being that the dates are changed and that in 1921 the limit of seed for a quarter section shall

not exceed \$100 worth, nor the total advances for seed grain and feed \$900, and that the provisions of the Dower Act shall not apply to mortgages under the Act.

An Act to Amend the Agricultural Societies Ordinance.—A new society shall not be formed unless its chief place of business is at least twenty-five miles from the chief place of business of any existing society.

To each society of over one hundred paid-up members the grant by the government is fifty cents per member up to two hundred members.

To each society holding an exhibition whose total expenditure for prizes exceeds \$400 in the case of the first exhibition, and exceeds \$500 in subsequent exhibitions, the grant is 60 per cent of the amount actually paid out for prizes, but not exceeding \$3,000. To a society holding a winter exhibition of poultry, the grant is 60 per cent of the amount paid in prizes without limit as to total. To a society holding a horticultural exhibition or a combined field crop and clean seed exhibition or a spring stallion show, the grant is 60 per cent of the amount paid in prizes, not exceeding \$300 for each. For a field grain competition 60 per cent not exceeding \$250 and for a good farms competition 60 per cent not exceeding \$100.

An Act to Amend the Stallion Enrolment Act.—No person, partnership, firm or corporation shall stand, travel or offer for services any grade stallion within the area in the Province bounded on the north by the North Saskatchewan River, and certain other exempted areas.

Provision is made for the cancellation of certificates of enrolment in certain cases, for liens on foals and for the collection of service fees in the case of mares leaving the province.

An Act to Amend the Veterinary Act.—Graduates of any veterinary

school or college approved by the Senate of the University of Alberta who have passed the examination prescribed by the Senate and who present to the Association a certificate to that effect signed by the Registrar of the University shall be entitled to be registered as veterinary surgeons.

The said Senate shall control the conduct of and all matters relating to the examination of candidates and may approve of certain veterinary schools or colleges as places of instruction, prescribe the conditions upon which any veterinary school or college may be approved, prescribe the subjects upon which candidates shall be examined, determine the fee which shall be payable by candidates and make rules and regulations respecting the times when examinations shall be held and respecting the applications of candidates therefor.

The right of a candidate to appeal from the Board of Examiners to the Minister has been struck out.

An Act to Amend the Live Stock Encouragement Act.—More rigid measures are provided for the collection by the government of moneys due for the purchase of live stock under the Live Stock Encouragement Act.

The Domestic Animals Act.—This Act provides definite restrictions for all stock driven along highways and running at large, with laws against any farm animals being driven off with herds. No round-ups may be held without the consent of the Minister of Agriculture.

This Act supersedes all existing pound by-laws and makes uniform all fence regulations.

An Act to Provide for the Registration of Names of Homes.—The registration of names of homes is provided for by this Act, such names to be exclusive and shall attach to the land unless legally relinquished on transfer of the home, protection being given to names already carried by ranches and stock farms.

An Act to Amend the Municipal Hail Insurance Act.—Municipal hail insurance is extended to December 30, and the insured may by due notice at any time before the crop is damaged increase his insurance from \$6 to \$8 or \$10 an acre.

The Improvement Districts Act.—Consolidates former laws in conformity with the organized municipalities, with the minister in the relative position of the local municipal council.

Several Acts were passed relating to Land Irrigation and Drainage regarding which it is not practicable to give a summary. A printed synopsis may be had on application to the provincial authorities. The titles of these are:—

The Water Users' District Act, 1920;

An Act to Amend the Irrigation Districts Act, 1920;

An Act Respecting Drainage Districts;

An Act to Assist Certain Drainage Districts.

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APPROPRIATIONS FOR AGRICULTURE

	1921	1920
Agricultural Societies.. . . .	\$130,000	\$110,000
Expenses of Officials Judges at Agricultural Exhibitions.. . .	11 000	9,000
Live Stock and Agricultural Institutes and Short Course Schools.. . . .	24,000	10,000
Production of Seed Grain.. . . .	9,800	12,000
Live Stock Encouragement Act.. . . .	24,000	24,000
Agricultural Agents and Destruction of Noxious Weeds.. . .	35,000	25,000
Stock Inspection.. . . .	35,000	30,000
Brands and Publication of Official Brand Book.. . . .	16,000	14,000
Administration of Stallion Act.. . . .	16,200	10,000
Collection of Agricultural and other Statistics.. . . .	6,000	4,500
Protection of Game.. . . .	30,000	25,010
Dairying.. . . .	37,000	33,200
Operation of Schools of Agriculture and Demonstration Farms.	184,500	128,000
School Fairs and Grants to same.. . . .	17,500	.....
Expenditure under Prairie Fires Ordinance.. . . .	3,000	3,000
Publicity Commissioner's Office.. . . .	25,000	25,000
Poultry Industry.. . . .	18,000	17,500
Women's Institutes.. . . .	18,000	15,000
Miscellaneous Grants.. . . .	17,050	16,800
For Encouragement of Draft Horse Breeding.. . . .	6,000	.....
Immigration and Exhibits.. . . .	10,000	10,000
Contingencies, etc.. . . .	4,500	4,500
To provide for Bonuses.. . . .	22,000	12,000
Transferred.. . . .	.....	1,800
	\$692,550	\$540,310

AGRICULTURAL INSTRUCTION GRANT, 1921-22 (FEDERAL)

Schools of Agriculture.. . . .	\$40,000 00
Women's Work.. . . .	9,500 00
Agricultural Representatives.. . . .	14,900 00
Poultry and Egg Marketing Services.. . . .	2,500 00
Miscellaneous.. . . .	65 62
	<hr/> \$66,965 62

BRITISH COLUMBIA

An Act for the Protection of Breeders of Goats.—The term "pure bred" relates to animals registered in the Canadian National Record for Goats at the Live Stock Records Office at Ottawa, or in the records of any goat record association eligible for register in the Canadian National Record.

Breeding sires may not be offered un-

less pure bred. For the first two years of operation of the Act, a pure-bred sire and grandsire is sufficient to qualify. During the third and fourth years the ancestry is further extended.

Minor amendments were made to the "Agricultural Act, 1915," to the "Animals Act," and to the "Brand Act, 1917."

AGRICULTURAL APPROPRIATIONS

	1920-21	1921-22
Minister's Office.. . . .	\$ 11,380 00	\$ 11,440 00
General Office.. . . .	35,658 00	34,996 00
Horticultural Branch.. . . .	101,840 00	93,540 00
Live Stock Branch.. . . .	64,632 00	73,462 00
Statistics.. . . .	4,720 00	4,720 00
District Agriculturists, etc.. . . .	17,380 00	16,270 00
Miscellaneous Grants, etc.. . . .	118,073 75	152,850 00
	<hr/> \$353,683 75	<hr/> \$386,778 00

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AGRICULTURAL INSTRUCTION GRANT, 1921-22 (FEDERAL)

Dry Farming Demonstration Stations and Field Crops.. . . .	\$ 500 00
Seed Work.. . . .	500 00
Silo Demonstrations.. . . .	1,750 00
Horticultural Demonstration and Competitions.. . . .	1,000 00
Fruit Packing and Pruning Schools.. . . .	500 00
Poultry.. . . .	750 00
Dairying and Cow-testing.. . . .	9,000 00
Beekeeping.. . . .	9,000 00
Boys' and Girls' Clubs.. . . .	800 00
Agricultural Journal and Publications Branch.. . . .	6,000 00
Pathological and Entomological Branch.. . . .	6,000 00
Miscellaneous.. . . .	399 06
Agricultural Instruction in Public, High and Normal Schools; training of teachers, grants.. . . .	10,000 00
University of British Columbia, College of Agriculture, Extension and Investigation.. . . .	23,000 00
	\$69,199 06

PRINCE EDWARD ISLAND

AGRICULTURAL INSTRUCTION GRANT, 1921-22 (FEDERAL)

1. Agricultural Buildings, Equipment and Maintenance.. . . .	\$ 1,050 00
2. Director and Agricultural Representatives.. . . .	4,300 00
3. Short Courses.. . . .	500 00
4. Drainage, Soils and Crops.. . . .	4,700 00
5. Live Stock and Dairying.. . . .	3,000 00
6. Poultry, Horticulture, Beekeeping and Co-operative Marketing.. . . .	500 00
7. Women's Institutes.. . . .	3,200 00
8. Elementary Agricultural Education, Agricultural Instruction in Public and High Schools, Training of Teachers, Allowances, Grants, Maintenance of Rural Science Department, Prince of Wales College.. . . .	12,100 00
9. Contingencies and Miscellaneous.. . . .	2,399 22
Total.. . . .	\$31,749 22

WINTER COURSES IN AGRICULTURE—ONTARIO

Suggested Improvements in Agricultural Representatives Courses for 1922

BY C. C. MAIN, B.S.A., AGRICULTURAL REPRESENTATIVE, LENNOX AND ADDINGTON COUNTY

AT the annual conference of agricultural representatives held at the Agricultural College, Guelph, this past summer, a committee was appointed to consider the Courses in Agriculture and Domestic Science. They were given the power to pass any resolutions which they considered would be of value in improving the instruction imparted at their winter courses. The report they submitted, which will be carried out by all the agricultural representatives this winter, is as follows:—

1. *Assistants*.—Where there are indications of a large class in agriculture, or

where, by reason of transportation difficulties much time would be lost by the assistant going from county to county, it is recommended that permanent assistants be appointed covering the duration of the course.

2. *Special Lecturers*.—Individual representatives alone know the lecturers most suitable for their class, and therefore the custom of selecting special speakers from a list similar to that furnished each office last year might advantageously be continued. Further it is urged that the practice of sending

extra speakers, other than those asked for, to the courses be discontinued.

3. *Demonstration Material and Equipment.*—It is urged that more charts should be available for class room purposes. There is need in some counties for collection of plant diseases, for soil testing equipment, etc.

4. *Joint Sessions.*—Where possible it is advisable to have Domestic Science and Agricultural Courses run concurrently. The sessions should be held separately unless the classes are small.

5. *Excursions, Banquets, etc.*—Where possible, features of this kind should be arranged. The practice in vogue in most counties of holding literary meetings is strongly commended.

6. *Junior Farmers' Improvement Associations.*—The organization of J.F.I. associations before the class disbands is recommended.

7. *Other Courses.*—It is recommended that not more than one four weeks' course be undertaken by a representative.

Aside from the above report, representatives will, no doubt, introduce new features to suit their particular counties. It is indeed difficult to lay down any hard and fast rule for a winter course in agriculture. The kind of education that is needed in one county is not at all applicable in another county, and this phase of the work must be worked out entirely at the discretion of the agricultural representatives in their various counties. For instance, some counties are particularly interested in horticulture, others in beef raising, others in dairying, and so on.

Illustration Material Necessary

One of the greatest needs in our winter courses in agriculture is for more illustration material similar to the "Wilson Meat Charts" on beef cuts, pork, mutton, and lamb cuts. Demonstration material relating to almost every subject discussed could be used very

advantageously in imparting to the pupils in a very instructive way the most opportune information of the day. For instance, in my particular county, I could use an up-to-date insect collection with particular stress laid on the most important insects that are doing damage to farm crops. When we have a new outbreak of insect injury, such as the corn borer, a specimen of the larvae in alcohol, showing the pupil exactly what they look like, would be of inestimable value to the students. Charts could be prepared by the Field Husbandry department showing the latest and best varieties of different classes of farm grains to grow. These would be of great value in teaching field husbandry. Charts could be prepared by the Animal Husbandry department showing the breeds of live stock that are most popular on Ontario farms. Comparative charts showing the scrub versus the pure bred would be of great educational value, and charts, illustrating the benefits to be derived from using pure bred sires on grade dams, would be of great assistance. Another feature of agricultural education which might be improved for the benefit of all concerned is the Motion Picture Bureau. I do not believe that the representatives have as many reels illustrating the various phases of agriculture as they would like to use in connection with the winter courses. Students, attending agricultural courses, should receive a thorough training in testing milk and cream and should be made familiar with The Dairy Standards Act. It is also a good policy, I believe, to deal with all agricultural legislation passed by the legislature during the preceding year. In this way, students are informed regarding the laws that pertain particularly to the farmers.

Problem Study

A feature which I introduced last year at the winter course was what we termed "Home Problems." Each student in the class was requested to set down in writing the ten most important

problems concerning which he or his father wished detailed and full information in connection with the practical operation of their farm. These questions were dealt with separately and fully, and provided the class with a great deal of valuable information on the problems confronting them in their every-day farm life.

Another feature, which I hope to introduce this winter, will be the problem of figuring out the cost and maintenance of products on the home farms. Certain students will be given definite problems to work out. For instance, one will be asked to keep an accurate and detailed statement of the cost of feeding a team of general purpose horses for one month; also to keep a record of the work they perform, and estimate the value of that work towards increasing the income of the farmer. Another student will be given the problem of figuring out what it costs to feed a dairy cow for a month, and will be asked to keep a record of the milk she produces, and the value in dollars and cents which it represents towards increasing the income of the farm. Other problems will be as follows: figuring out the cost of feeding sheep, swine, beef cattle, poultry, etc.

The Practical Side

Another new feature, which undoubtedly would be a great help to the students of winter courses in agriculture, would be to have the leading and most successful farmers in the various branches of farming most extensively practised in the county, address the class on exactly how they manage their farms.

These men are living right in the neighbourhood under the same conditions as the students themselves, and the methods that they have proved to be successful in their practical farming operations would undoubtedly prove successful with the new students just starting farming. What these practical farmers would have to say would perhaps carry greater weight than addresses given by outside men.

It appears to me that a full course of study of markets and market requirements would be a great help in assisting the students to market their products to best advantage. Young farmers are not familiar with the market requirements of the various classes of live stock, and judging competitions on the hoof, followed with killing demonstrations and judging competitions on the dressed carcasses, would bring out the points to be emphasized in catering to our higher class markets.

It is a good idea to encourage students to take an interest in reading. A circulation library may be formed and books loaned to the students for certain set periods. A library may be the means of getting the students to read and think for themselves, which is a very important factor in securing an education, agricultural or otherwise. Departments of Agriculture publish a large number of bulletins which give detailed information on a wide range of subjects, but it is surprising the number of practical farmers who do not know where to write to obtain the desired information regarding subjects in which they are particularly interested. Students should be informed as to where such information may be obtained, as the knowledge is bound to be great value to them.

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MINISTER OF AGRICULTURE FOR ALBERTA

THE new Minister of Agriculture for Alberta, Hon. George Hoadley, brings to his office a wealth of practical experience and sound judgment. The portfolio which he holds is undoubtedly the most important portfolio in the Provincial Government. A province such as Alberta must depend upon agriculture as the foundation of its prosperity, and a live Department of Agriculture may exert a very powerful influence on the progress of farming generally. A new province such as Alberta naturally has numerous agricultural problems which must be faced with courage, determination as well as foresight and judgment. Hon. Mr. Hoadley seems to combine these qualities in a very remarkable degree and as a result we are quite sure that his influence will find expression through the various branches of the Department of Agriculture.

Hon. George Hoadley was born in England and emigrated to Canada thirty-one years ago, coming direct to

the Prairie West. He located near Calgary, and being attracted by the rich native grass and by the favourable climate, decided to enter the live stock business. Since then he has been continually in the horse ranching and farming business in the vicinity of the foothills, having bred up a substantial and useful herd of farm horses. He has been an active member of practically all of the live stock and agricultural associations since their establishment, having taken a particularly prominent part in the live stock associations, and is at present the Vice-President of the Western Canada Live Stock Union. He has represented the constituency of Okotoks in the Provincial Legislature for the past nine years, and during a portion of that time was Leader of the Opposition in the Provincial House. He has taken a very active interest in the farmers' movement for several years past and contested his riding as the farmers' candidate in the recent Provincial contest, being elected by a large majority.

PART III

School Agriculture and Related Activities

AGRICULTURAL EDUCATION IN CANADA—*Concluded*

BY J. B. REYNOLDS, M.A., PRESIDENT ONTARIO AGRICULTURAL COLLEGE

The Agricultural Schools

An agricultural school, as distinct from an agricultural college accepts students without requiring a definite academic standing, and offers a course which does not in that school end in a degree. Of the agricultural schools in Canada, the chief are the school of agriculture at Truro, Nova Scotia, the school at Kemptville, Ontario, and six schools in Alberta. Besides these, most of the agricultural colleges offer two or three-year school courses in addition to the college course. A glance over the curricula of these schools, and a comparison of them with the curricula of agricultural colleges reveals close similarity. The work is different in extent and in degree, not in kind. The college work is of course more advanced, with an emphasis on the science of agriculture, while the school work emphasizes the art. Also, the college adds certain subjects, such as rural sociology and economics. The close relation possible between school agriculture and college agriculture is shown by the fact that the premier agricultural college in Canada, the Ontario Agricultural College at Guelph, has for thirty-two years—from 1888 to 1920—made its two-year school course coincide with the first two years of the four-year degree course. Manitoba followed the same plan from its inception in 1906. Admission to the third year of the degree course was granted to those who had obtained a fifty per cent proficiency on all second year work, and sixty per cent in English. Under

present regulations, the school course is entirely separated from the college course, both in conditions of entrance and in curriculum. The purpose of the agricultural school course is to add agricultural science and a general education to the practical experience of the farmer gained on his farm, so that he may be the better fitted to deal with the problems of farm production, to handle the business of farming, and to be a useful member of the country community. That is, the two-year course is designed primarily and chiefly for those who intend to farm.

It may reasonably be supposed that the work of the school of agriculture could be accepted as a preparation for the college of agriculture, in the same way that the public school prepares for the high school, and the high school for the university. There are, however, certain important considerations to be taken into account here. The course in the school of agriculture is supposed to be complete in itself, to present the results and not the methods of agricultural chemistry, botany, plant breeding, and the other sciences applied to agriculture. Also, the school admits students without any prescribed academic education, and gives a technical course with a minimum of academic subjects. Hence the agricultural school neither requires for admission nor provides in its course the necessary academic training for admission to the agricultural college. In fact, a high school course with the agricultural option is a better pre-

paration for the agricultural college than is the course given by the agricultural schools, as the work of these schools in Canada is at present constituted.

In some of the United States, there are preparatory schools that are denominated by the agricultural colleges "approved" schools, whose students are accepted by the agricultural colleges. Such schools—those in Minnesota, for example—are rather agricultural high schools, with a strong academic course along with a course in agriculture similar to the course already outlined in this paper. It would seem that the Canadian schools of agriculture may become high schools teaching the required academic courses as well as agriculture, or, be content to remain what they now are and what they mainly profess to be—offering short practical courses for those who intend to farm and who have not time to take a longer course.

There is a general feeling that the opportunity should be provided somehow whereby the agricultural college may give credit in its course of study to the work taken in the agricultural school. The school cannot, without defeating its purpose, require for admission an academic standard of education. Its doors must be wide open for the training of practical farmers in technical agriculture. The school at Truro, Nova Scotia, offers what is called a "scholastic diploma" following a course which provides some academic instruction. Usually those who have taken that course have been men who already had received some high school education. With the necessary academic standing as a pre-requisite, and with a two-year school course parallel to the first two years of the college course, candidates from the schools may be admitted to the colleges on certain conditions of extra subjects to be covered. But generally, those who are qualified to enter the college and are likely later to wish to proceed to the degree, should enter the college at the start.

The Agricultural Colleges

Both in their organization, and in their activities, the agricultural colleges of Canada have evolved in obedience to their environment. The Ontario School of Agriculture was inaugurated in 1874, as a result of the same counsel which originated the School of Practical Science. It commenced and has remained as a branch of the Department of Agriculture of the Ontario Government and is maintained by annual vote of the Legislature. In 1879 it was made the College of Agriculture, but continued offering the two-year course only until 1887, when a third year was added, and under affiliation with the University of Toronto, the degree of Bachelor of Science in Agriculture was conferred. In 1902 the course was lengthened to four years, but no standard of admission was established. Until 1920, the two-year school course coincided with the first two years of the degree course, as explained earlier in this paper. In 1920, the two courses were separated, and of those entering for the degree course, matriculation is now required with some modifications in favour of candidates with extended farm experience and of mature age.

The Manitoba Agricultural College was organized on the same plans as in Ontario. The degree course there is five years of five and a half months each.

Neither of these institutions is a faculty of the university. Both have their own staff of teachers, for academic as well as for technical instruction, and their own premises and courses of study. The college in Manitoba is governed by a board of directors, through whom appointments, promotions and appropriations are recommended to the Government. In the Ontario Agricultural College, all these affairs are conducted by direct negotiation between the President of the college and the Minister or the Deputy Minister of Agriculture.

Macdonald College at Ste. Anne de Bellevue was built and endowed by the late Sir William Macdonald, for the

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purpose of teaching Agriculture and Home Economics to English-speaking Protestants of the Province of Quebec. This college is a faculty of McGill University.

The agricultural colleges in Saskatchewan, Alberta, and British Columbia also are organized as faculties of the provincial universities. There are thus the two types of organization, the one type being organically separate from the university but affiliated with it; the other type a university faculty.

The activities of these colleges have grown in response to the public demands. The original purposes in Ontario were to teach agricultural science and practice to intending farmers and to conduct investigations in farm, garden and orchard crops and live stock, and to publish the results of these investigations. All these purposes have been continued. The degree course was added to supply a public demand for technical agriculturists, teachers in agricultural schools and colleges, directors and investigators in experiment stations, commissioners and administra-

tors in the various branches of the federal and provincial departments of agriculture, agricultural journalists, and agricultural representatives stationed in the rural districts for the purpose of carrying the college teaching directly to the farmers.

The extent to which the agricultural colleges have widened their activities to serve agriculture and the rural communities, is indicated in the accompanying diagram. With slight variations all the agricultural colleges of Canada have developed much the same kinds of service. Agricultural extension policies are not entirely uniform in the provinces, with respect to division of work between the college and the political department of agriculture in the government. The American system is generally to centralize not only agricultural instruction but administration also, in the colleges. No definite system has been evolved in Canada as yet, and phases of agricultural extension have been appropriated in some provinces by the college, and in some by the Department of Agriculture.

COLLEGE BRANCHES	REGULAR COURSES	SHORT COURSES	EXTENSION	INVESTIGATION
<i>Animal Husbandry</i> —	Breeding, feeding, judging, management, marketing.	Judging pure-bred and commercial stock.	Judging at fairs and exhibitions, correspondence meetings.	Breeding and feeding.
<i>Apiculture</i> —	Anatomy, life-history, diseases, management.	Commercial management.	Provincial supervision of the industry.	Wintering and queen rearing.
<i>Dairying</i> —	Science and practice in manufacture of dairy products.	Factory courses in cheese and butter making, farm dairying.	Judging, correspondence meetings.	Neutralization and pasteurization of cream for butter making.
<i>Farm Mechanics</i> —	Wood-working, forging, farm machinery.	Gas engines and tractors.		
<i>Field Husbandry</i> —	Production and improvement of farm crops.	Seed-judging	Judging correspondence meetings, Experimental Union.	Testing varieties, plant breeding.
<i>Horticulture</i> —	Fruit, vegetable and flower culture, landscape gardening.	Fruit growing, rural beautification.	Judging at fairs, correspondence meetings.	Testing varieties, crop researches, plant breeding.
<i>Poultry Husbandry</i> —	Breeding, feeding, judging, management, marketing.	Commercial management.	Judging, correspondence meetings, culling demonstrations.	Breeding and management.

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COLLEGE BRANCHES	REGULAR COURSES	SHORT COURSES	EXTENSION	INVESTIGATION
<i>Farm Economics—</i>	Farm accounting, business analysis, management.	Planning and management of farm business.	Correspondence meetings	Farm business, surveys, cost of production.
<i>Veterinary Science—</i>	Anatomy, physiology, materia medica.	Horse-judging.		
<i>Bacteriology—</i>	Of the soil, the dairy, the household.	With dairying and horticulture.	Examination of spoiled foods and diseased animal specimens.	Diseases of plants and animals; soil and dairy.
<i>Botany—</i>	General and economic botany, pathology, and ecology.	With field husbandry and horticulture.	Plant diseases, weed eradication.	Diseases in greenhouse, smut in grain, potato diseases.
<i>Chemistry—</i>	General chemistry, soil fertility, bio-chemistry.	With dairying and horticulture.	Food analysis, soil renovation.	Flour and bread, milk and milk products.
<i>English—</i>	English and Canadian literature, journalism, public speaking.		Reading courses, rural plays, debating clubs.	
<i>Entomology, Zoology—</i>	General anatomy and physiology, economic studies.	With bee-keeping and horticulture.	Work of Provincial Entomologist.	Corn-borer, cabbage maggot, systematic-research.
<i>Mathematics—</i>	Mensuration, geometry, algebra, trigonometry.	With dairy course.		
<i>Physics—</i>	Mechanics, hydrostatics, electricity, drainage, meteorology, climatology.	Gas engines and tractors, drainage.	Field work, plans for farm drainage.	Farm utilities survey.
<i>Political economy and Rural Sociology—</i>	Trade, markets, co-operation, civics, community problems.	Sociology with course for rural leaders.	Co-operative enterprise.	Rural social surveys.

General Problems and Results

The developing situation in Canada has presented to those concerned in agricultural education certain economic and social problems, to the solution of which agricultural education must contribute. These problems may be stated thus:

1. To secure on the farms of Canada the continuous use of the best known farming practice.
2. To maintain conditions of rural living satisfactory to those who are intelligent enough to farm well, and gen-

erous enough to live well and to be good citizens.

That these two needs may be provided for, agricultural education has evolved, and has attempted specifically to train leaders—resident leaders and professional leaders.

The developing situation in Canadian agriculture has involved these factors:

1. A soil becoming farther and farther removed from the fertility of virgin conditions. Only good farming can maintain unimpaired the fertility of the soil. The good farmer, therefore, is confronted with a double task—

the one, in self-interest, to make a living from the soil, the other, in the public interest, to maintain undiminished the natural resources of soil fertility. The tremendous implications of this factor as it relates not only to the responsibility upon technical education, but also to that upon education for citizenship, are entirely obvious.

2. A hostility in nature against artificial improvement of plants and animals. The physical law of the Degradation of Energy, or something analogous in biology, tends to counteract the improvement of species by human selection or humanly-devised plans of breeding. The products of breeding-stations are placed in the hands of practical farmers, but unless they exercise much the same knowledge and skilful care as was required in producing the improved strains, degeneration is certain and rapid. Nature produced the wild oat, and the domesticated oat tends to revert. Natural selection has produced the moose and the bison, but not the Shorthorn or the Polled Angus. The more our farm products are the results of human selection, the greater the knowledge and skill required to hold what we have.

3. A developing industrialism, in which agriculture has found a formidable rival in the labour market. So much so, that at the present time there is no economic basis of wages in any industry except in farming. On the farm, the tendency is to pay what a man can earn. In industrialism to date the tendency is to pay what organized labour may demand, and by means of economic privileges not shared by agriculture, to pass on the costs of production to the consumer. Such conditions demand of the farmer business ability and economic knowledge not required in Canada forty years ago.

4. The growth of industrial and commercial centres, which have offered business opportunities and physical and social attraction that make the country seem dull, stale and unprofitable by comparison.

5. Our educational and social ideals which have declared that overalls do not go with dignity and respectability, and that education is a means of escape from labour.

Unsettled rural conditions have been the result of these factors. Farms have changed hands, and thus a means for continuing good farming practice has been wanting. There have been no traditions possible with a shifting farm occupancy. Whole families have moved from country to town, and there has been a similar want of rural social tradition. With this lack of permanency has followed lack of incentive for farm improvement, and for the addition of household conveniences. Thus rural utilities and rural improvement and rural beautification lag behind. Country schools have not kept pace with town schools, and country churches are dying of inanition.

These facts are mentioned as constituting the real problem of agricultural education. Each new generation of farmers has to be taught the principles of good farming, with little aid from a farming tradition. Each new rural generation has to be taught to live in the country with little aid from a rural social tradition. But in spite of all, if Canada is to maintain a stable and durable civilization, there must be maintained on the farms the best known farm practice, and conditions of living in the country must be maintained satisfactory to those who are intelligent enough to farm well, and generous enough to live well, and public-spirited enough to maintain unexhausted the soil's store of fertility.

BOYS' AND GIRLS' CLUB ORGANIZATION AND WORK IN SASKATCHEWAN

BY H. SAVILLE, ORGANIZER OF BOYS' AND GIRLS' CLUBS

THE first school exhibition in Saskatchewan was held in 1909. The development was slow for the first few years but has moved rapidly recently until in 1920 there were 262 school exhibitions held in the province at which approximately 40,000 children exhibited their work. Only a small proportion of these, however, can be classified as bona fide members of organized boys' and girls' clubs.

This year over one hundred centres—embracing several hundred schools—are carrying on boys' and girls' club work, and the present rate of progress of the work indicates that it is becoming one of the outstanding features of our educational system.

Inception of the Movement

The inception and development of Boys' and Girls' Clubs in Saskatchewan has been along somewhat different lines from those followed elsewhere in Canada. In some other provinces the showing of products of both field and classroom that culminated in the holding of organized school exhibitions and junior fall fairs, began with the exhibiting of agricultural produce and later included exhibits of writing, composition, art and other classroom work. That is, it began outside the school and gradually moved inward, and consequently agriculture and household science have held the premier position over school work in these places. In Saskatchewan the movement began inside the school and gradually worked outwards, so that classroom products have been greatly in the majority at school exhibitions up to the present time. Organized raising and exhibiting live stock, vegetables, etc., is a comparatively recent innovation and is scarcely past the experimental stage. In

1919, pig raising, poultry raising, potato growing, gardening and canning had been given particular recognition, but by 1920 it was found necessary to add calf and sheep raising, colt training and stock judging, while gardening and canning which had hitherto been conducted as one contest were divided into separate activities.

In other provinces, club projects include sewing, cooking, baking, wood working and similar training. The reason these have not yet been placed on the Saskatchewan club programme is that these activities are provided for in the regular course of school studies and it is the aim of club work to avoid overlapping and to supplement rather than duplicate instruction given in the class-room.

Recent Developments

Local administration of club work was at first exercised in most places by the agricultural society, but the tendency appeared to be to emphasize material rather than educational accomplishments. It was soon noticeable too, that the aims of the work could be better fulfilled by linking it up more closely with the school and school exhibition.

In 1918 a director of Boys' and Girls' Clubs was appointed as an assistant to the director of agricultural extension at the University of Saskatchewan.

Early in 1920 a conference was held regarding the future development of the club work, at which it was decided that since these activities were so closely related to the rural education associations and school exhibition work of the province, it would be advisable to place this phase of agricultural extension work

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among boys and girls under the control of the Department of Education.

Consequently the Board of Governors of the University of Saskatchewan authorized the transfer of the boys' and girls' club work from the university to the Department of Education. In March the transfer took place, and the work was definitely incorporated with the Rural Education Association and School Exhibition system of the province. An assistant to the Director of School Agriculture was appointed as organizer of Boys' and Girls' Clubs, with headquarters at Regina.

Farm boys' and girls' camps which are attended annually by hundreds of young people remain under the supervision and direction of the University Extension Department. The Director of Extension co-operating with the provincial Department of Agriculture and the boards of the Saskatoon and Regina Exhibition Associations conducts contests in stock and grain judging, crop and weed identification, etc., for older boys, and while assistance is rendered by the Department of Education, these boys and girls and their work do not come under the jurisdiction of the Boys' and Girls' Club branch.

Departmental Assistance

Personal supervision of club work cannot be conducted locally by members of the Department of Education and it is necessary for the permanent resident of each community to co-operate with the teachers in order that the children may receive personal and individual instruction and encouragement.

Literature consisting of bulletins, instruction circulars, record cards, enrolment forms, exhibition report forms,

etc., are supplied freely by the department. Instruction circulars are in the form of single-page leaflets containing concise information regarding the most approved methods of raising live stock and vegetables, canning, etc. These have been written expressly for children and can be easily understood by the youngest club members. Record cards contain about a dozen simple questions, which when answered give brief information as to the kind of stock and vegetables raised, the methods employed, the cost and value of the produce and the profit resulting from the work. This card is filled in by the raiser of the produce and accompanies the exhibit on fair day.

The department does not undertake to supply young stock, eggs, etc., to club members, but co-operating with the Department of Agriculture and the Agricultural College, assists as far as possible in giving the names and addresses of breeders who have young stock for sale.

In January, 1921, the Department of Education commenced publication of a monthly periodical entitled "The School Agriculture and Club Leader," devoted almost entirely to the interests of school agriculture and associated activities. One section of the publication deals with Rural Education Association interests, another with school exhibition affairs, a third with boys' and girls' club work and a fourth with general topics. The "Leader" is sent to all school teachers, newspapers and banks in the province as well as to every enrolled member of a Boys' and Girls' Club, and contains much timely and serviceable information of value to all interested in rural education.

SUGGESTIONS FOR PRACTICAL WORK IN THE TEACHING OF AGRICULTURE

BY NORMAN DAVIES, B.A., TEACHER OF SCIENCE AND AGRICULTURE, RENFREW
COLLEGIATE INSTITUTE

WHETHER or not to have a school garden is the question facing many teachers about to begin the teaching of agriculture. The school garden is very important both to teachers and pupils. For public school work the requirement in Ontario is six square rods in order to qualify for grants, but a smaller area is worth while even if no grant is secured.

Numerous topics can be illustrated in the school garden. The method of planting, the care and harvesting of different crops can be taken; the study of insect pests and fungous diseases of plants, and methods of control; methods of conserving soil moisture, and problems of drainage; the growing of small fruits and the care of fruit trees including budding and grafting; practical work in measurement in laying out the plots; the study of common garden weeds and methods of eradication, and many other topics can be given a practical angle. The flower garden is important, for in it the methods of planting bulbs, perennials and annuals can be shown. The school garden provides the material for teaching many of the agricultural topics by the laboratory or demonstration method, so that pupils can see methods and results as well as hear about them. The teacher will also derive benefit in having actual results as a basis for the information given to the pupils. The school garden adds a zest and an interest to the work which cannot be secured by classroom work alone.

In addition to the individual plots, planted and cared for by one or more pupils, an area planted under the direction of the teacher for class purposes is worth while. Such an area might represent a kitchen garden about 60 to 80 feet long by 20 to 30 feet wide. A

third of this area could be planted in permanent crops, as strawberries, raspberries, rhubarb, and so on; another third in smaller vegetables, and the remainder in potatoes, corn and tomatoes. Such a garden shows method of planting a small area and the variety and yield; while from the strawberry and raspberry patch, plants may be supplied to the pupils. Last spring, about fifteen pupils from our classes took from 50 to 100 plants for planting in their gardens at home. Next year I expect to supply a few raspberry plants and possibly some rhubarb roots.

For the past three years, I have planted in a part of the garden small plots of fall wheat and fall rye, each year planting the seed grown in the previous season. My object is to secure plants more resistant to frost and to test each year the value of a commercial fertilizer. Results have been encouraging and each year the plots of wheat came through the winter in a better condition. The rye has never been seriously harmed. The wheat always shows a higher yield on the fertilized plots, while the rye has never shown any advantage from the use of fertilizer. I use this result in classwork to point out the importance of testing a small portion of a field for each crop before investing extensively in commercial fertilizer.

Where the area of the garden is larger than required for the work already mentioned, it is worth while to plant some marketable crop. Potatoes answer the purpose, but in some localities sweet corn, tomatoes or carrots and beets might be grown very profitably. The results can be used to show that the methods taken up in the classroom are practical and the revenue assists in paying expenses. Last year

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from one-eleventh of an acre, the yield of potatoes was 283½ bushels per acre. The value of the crop was \$265.65 per acre and cost \$157.50 per acre, giving a profit of \$108.15 per acre. Such calculations based on actual results are of greater value than estimates based on the results of some one else.

This year eight varieties of potatoes have been planted—24 hills of each. One set of plots is in sandy loam, and the other in heavy clay soil. When dug, the yield from each plot will be weighed. The results will show which early and which late varieties are best

year a small flock was secured in the fall and kept till June. During that time the value of eggs laid and value of fowl when sold exceeded cost of birds and feed by \$10. Last winter, two pupils, who had raised chickens from eggs hatched at the school were given the use of the poultry house. Both have now built poultry houses at home. This winter a flock of Silver Campines will be kept. This is a new variety for this locality. They are fair layers and economical feeders. During last spring about 475 chicks were hatched in the school incubators. Many



RENFREW COLLEGIATE SCHOOL GARDEN

Partial view of kitchen garden and poultry house. Eight varieties of potatoes under test.

suited to our types of soil. Such work opens up a wide field to the thinking boy or girl, and shows that agriculture is not a stereotyped, single-tracked occupation.

At one corner of our school garden there is a poultry house of up-to-date construction. Chickens are kept in this building throughout the year except in July and August. The first

pupils brought eggs from home for early hatching while others bought Ontario Agricultural College eggs, which were secured for school work.

Such experiments as these are difficult for the public school teacher, but not at all impossible. They should be easily carried out by the high school teacher who is usually more permanently located.

Each teacher might, from among the numerous topics of the curriculum select one or more which can best be developed in the locality. For town schools, gardening and poultry work could be made the hobby, and more attention given than required by the curriculum. A hotbed belongs to garden work and could be easily prepared in connection with other garden work. If the teacher emphasizes one or two things, there will be a more real and lasting effect.

Should some of the readers feel that the work outlined stresses the economic too much, it might be well to bear in mind that we deal with the economic aspect in many other studies. Geography, history, and science all have a bearing on economic problems, and we do not hesitate to discuss them. Are we in Canada behind in this phase of agricultural teaching? In Wisconsin there is in one locality a

school which supplies from its farm the seed corn for the farmers nearby; in another case the growing of hemp has become a main industry and it was first introduced by a high school principal who was the teacher of agriculture. If our teaching of agriculture is to benefit in a real sense, the need for more people in the rural districts, we must pay some attention to the economic, so that the boy or girl will have an enlightened mind on the subject and be better able to choose his or her future work. The school where agriculture is taught might become in a small way a more direct benefit to the community; not overlapping present organizations, but co-operating with them to a greater degree than at present, and secure the hearty support not only of the agriculturist, or person interested in agriculture but not engaged in practical work, but of the practical farmer as well.

NOVA SCOTIA SUMMER SCHOOL OF TEACHERS

THE Nova Scotia Summer School for Teachers of 1921 was equal to that of 1920 in some respects, and surpassed it in others. Every forenoon was devoted to classes in scientific subjects; every afternoon to field and laboratory work and to athletics, playground methods, basketry, story-telling, and folk games; every evening to social gatherings, entertainments, debates, public speaking contests, and moving pictures. Interesting lectures were delivered by a number of outside speakers who discussed the various phases of community activities in which the teacher has the opportunity to engage. The Department

of Public Health supplied eight lectures. The Chautauqua programme brought a pleasing variety to the course.

According to custom a pageant was staged in which the students got a valuable practice in dramatization. This year, the pageant portrayed the growth of public schools and general education from the dawn of civilization to the present day.

The enrolment was 137, and, as usual, the excellent school spirit was all that could be desired. Enthusiasm was contagious. With such whole-hearted workers going out over the province, the outlook for school efficiency is encouraging.

BOYS' AND GIRLS' CLUB WORK IN NEW ZEALAND

A LITTLE over a year ago the first boys' and girls' clubs were organized in New Zealand, and the movement, which started in the South Taranaki district, bids fair to extend widely. Mr. J. W. Deem, Field Instructor of the Department of Agriculture at Manganui, in an article in *The New Zealand Journal of Agriculture* for July, gives a full account of the methods adopted and the results of the first contest. A committee representing the Farmers' Union, the Agricultural Department, the Education Board, and the school teachers had the matter in charge, and the success achieved was largely due to their enthusiastic and united efforts. For local supervision, a resident member of the Farmers' Union was appointed in each school district; the school teachers were asked to assist, and the writer states that, after a season's experience, he can testify to the great importance of the teachers' influence, as on their attitude largely depends the success or failure of the work.

The first contest was limited to the growing of mangolds and swedes, and it is interesting to note that the two most successful schools had a lady teacher in charge, and that the champion mangold and swede crops were grown by girls. Nineteen schools entered the competition with 140 entries for mangolds and 52 for swedes. The Department of Agriculture supplied the

seeds, the manures, and the printed instructions.

In judging the crop a scale of points was used: one-half point for each 5 cwt. of roots; quality 10 points, cultivation 20 points, and records 40 points. Cultivation and records were thus made the strong feature of the work.

An arrangement was made whereby the competitors accompanied the local supervisor and judge from plot to plot. In several instances during the judging, the supervisors of adjoining clubs brought their members along. The opportunity thus afforded for comparison aroused keen rivalry, and many a competitor who had a poor plot, on seeing a good one and listening to the complimentary remarks of the judge, resolved to do better next year. Each school was allotted a first, second and third prize, while each group of schools was awarded three prizes for the three best crops in the group. There were also three championship prizes for the three best crops in the whole district. A handsome challenge shield was also presented by a business firm to the school securing the highest aggregate number of points.

In addition to field root clubs, calf clubs are being started for the coming season and are attracting good entries. Accounts that have appeared from time to time in *The Agricultural Gazette* of the methods of conducting Boys' and Girls' clubs in Canada were of much assistance in planning the work in New Zealand.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes

NEWS ITEMS AND NOTES

The Right Hon. Sir A. Griffith-Boscawen, Minister of Agriculture for the United Kingdom, announces that although the Government has abandoned the policy of guaranteed prices and control of cultivation, they are determined to pursue the policy of education and research as the most permanent method of improving agriculture.

The Sherbrooke Exhibition Association this year provided competition between the displays of ex-soldiers established on farms organized by the Soldier Settlement Board. The displays consisted of farm and market produce, in which there were twenty competitors. The prizes ranged from \$30 for first to \$5 for sixth award.

Rural credit loans in Manitoba made this year up to July 1, amounted, for the purchase of live stock, to \$111,340, for machinery \$76,556, putting in and taking off crop \$219,887, breaking \$223,423, seed grain \$138,289, improvements \$65,860, retiring liabilities \$459,306, sundry purposes \$578,400. A sum approximating \$100,000 has been subsequently loaned for land breaking and the purchase of binder twine.

The article giving an account of the "Home Making Course for Girls," which appeared on page 559 of the September-October issue, was by error attributed to the Province of New Brunswick. This account related, as the contents indicated, to the short courses for girls put on at the Agricultural College, Truro, N.S., under the direction of Miss Helen J. Macdougall, Superintendent of Women's Institutes.

As a result of the efforts of Dr. J. H. McDunnough, of the Entomological Branch, during the past summer over 6,500 specimens

have been added to the National Collection of Insects. Although he did not have ideal collecting weather, he obtained some very desirable material, including species either not represented in the collection or else represented by a very poor series.

Mr. Criddle, of the Entomological Branch, reports that the wheat stem saw-fly has done serious damage this year, particularly in the southwest portion of Manitoba. Messrs. Criddle and Vroom took a long trip through the worst infested districts and reported that fields showing 70 p.c. fallen straws were encountered, whereas in others the entire field was almost entirely cut off. Grasshoppers have migrated to new districts and threaten to cause trouble next year.

During a trip through the western provinces in September, the Dairy and Cold Storage Commissioner, Mr. J. A. Ruddick, addressed the conferences of provincial officials and creamery men at Winnipeg, Regina, and Edmonton on the Grading of Dairy Produce.

Mr. G. H. Barr, Chief of the Dairy Division, acted as judge of dairy products at the exhibitions held in September at St. John, N.B., Shawville, P.Q., and Charlottetown P.E.I.

In view of the increasing recognition of the value of cold storage for the preservation and transportation of perishable articles of food, the International Institute of Cold Storage has arranged for the publication of a monthly Bulletin of Information in English and in French. There will be embodied in the Bulletin all the scientific, technical and economic documents of the world bearing on the subject. The publication aims at bringing quickly within easy reach of scien-

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tists and manufacturers knowledge of the progress that is being made everywhere in cold storage. The International Institute Branch of the Department of Agriculture at Ottawa has the matter in hand for Canada.

NEW BRUNSWICK WOMEN'S INSTITUTES

The Short Courses in Household Science for 1921 held under the auspices of the Women's Institute Division of the Department of Agriculture were confined to the French speaking districts of the province, and were highly successful.

Classes in Cookery, Sewing, and Nursing, under the instruction of Miss Nutter, Miss LeBlanc, and Miss Landry, R.N., respectively, were held daily in five centres convenient to the women and girls of those districts. The attendance was especially gratifying.

At the conclusion of the Household Science classes, demonstrators were sent to each and every Institute in both the French and English speaking districts of the province.

The annual Summer School for Rural Improvement was held at Macdonald College early in the month of August. The total number of students registered was 88, of whom 46 were resident in the province of Quebec and 37 in the province of Ontario. The course, which extended for a period of ten days, was held under the joint direction of Macdonald College and the Theological Colleges of Montreal, with the following speakers and topics: Rev. Professor W. A. Gifford,—Ten lectures on "The Social Principles of the Prophets and Jesus"; President Kenyon L. Batterfield,—Ten lectures on "A Rural Democracy"; Principal D. L. Ritchie,—Ten lectures on "Religious Education and Leadership"; Professor Sinclair Laird,—Two lectures, "The Church and the School," "Better Schools and Better Teachers"; Professor W. Lochhead,—Three lectures on Geology and four lectures on Genetics; Professor B. T. Dickson,—Four lectures on "Plants and Plant Life"; Dr. H. D. Brunt,—Four lectures on "Economic Problems."

THE NORTHWESTERN HORTICULTURISTS, ENTOMOLOGISTS AND PLANT PATHOLOGISTS

The fourth annual conference of the Northwestern Horticulturists, Entomologists and Plant Pathologists was held at Hood River, Oregon, in July last. This organization is international. The programme included a paper by E. W. White, Assistant Horticulturist of the province of British Columbia, on Apple Tree Anthracnose, or Black Spot Canker Control. In the election of officers

William Downes, an official of the Entomological Branch of the Federal Department of Agriculture, stationed at Victoria, B.C., was elected vice-president of the association. The delegates to the conference included five members from the province of British Columbia.

CONFERENCE OF VETERINARIANS

The Minister of Agriculture for the Dominion, the Hon. S. F. Tolmie, has called a conference of veterinarians to meet in Ottawa on November 15 and 16 to discuss the best means for safeguarding the health of Canada's live stock. Representative veterinarians from every province in the Dominion have been invited to attend. Consideration will be given to the formation of a National Veterinary Association to work in conjunction with the Department in protecting Canadian herds and flocks.

While probably no country in the world has a better record than Canada as regards freedom from live-stock diseases, due largely to the inspection system of the Department's Health of Animals Branch, the enormous losses experienced by foreign countries make it imperative that extreme vigilance be exercised to guard against the introduction into Canada of such diseases, and the time is regarded as opportune for securing greater co-ordination of effort between practising veterinarians and officials of the Health of Animals Branch.

The Alberta Department of Agriculture recently opened an office for an Agricultural Representative at Lethbridge, appointing Mr. M. L. Freng to the position, with Mr. William Wilson as assistant. Mr. Freng was formerly farm manager at the School of Agriculture, Claresholm; then for two years he was manager of Mr. George A. Fuller's large Hereford farm at Girvin, Sask. From there he became principal of the new School of Agriculture and Farm at Gleichen. Mr. Freng is a capable and practical farmer, a good judge of live stock, and an efficient teacher in the class-room. Mr. William Wilson is a graduate of the University of Alberta in Agriculture and has done considerable judging at the district fairs of Alberta during the last three years, his specialty being beef cattle and sheep.

On September 15 an international conference was held at Sandusky, Ohio, to discuss the European Corn Borer situation. Fifty-two entomologists were present at this meeting, including Dr. E. D. Ball, Assistant Secretary of Agriculture of the United States; Mr. W. R. Walton, Mr. L. H. Worthley, Mr. D. J. Caffrey, of the Bureau of Entomology, Dr. W. A. Orton, and Dr. K. F.

Kellerman, of the United States Federal Horticultural Board, and entomologists from all the neighbouring States as far south as Mississippi. The Entomological Branch was represented by Messrs. Gibson, McLaine, and Crawford, and Professor Caesar represented Ontario. Free discussion on the seriousness of the situation was held at the three sessions held. Through the courtesy of the State of Ohio, the Fish and Game Commission cutter took most of the delegates to Port Stanley, Ont., the following day. On the morning of the 17th the party was joined by Dr. J. H. Grisdale, Deputy Minister of Agriculture, by Mr. Spencer, of the Ontario Department, and by several members of the staff of the Entomological Branch. Some of the worst infested fields in the vicinity of St. Thomas were then visited by the party. At the closing session, held on Saturday afternoon, resolutions were passed by the convention dealing with the present situation and recommending a policy to be adopted in the future.

Hon. Manning Doherty, Minister of Agriculture for Ontario, has just announced the appointment of the Agricultural Development Board to administer the farm loan legislation passed at the last Session of the Ontario Legislature. The Board is made up as follows:—A. G. Farrow, Oakville, Chairman; W. Bert Roadhouse, Deputy Minister of Agriculture; T. R. Jennings, Assistant Auditor. It is expected that the Chairman will be the chief administrative officer in connection with this matter and the other two members, while retaining their present

positions unchanged will merely act in an advisory capacity without remuneration. It will be noted that one has been selected from the Department of Agriculture and one from the Treasury Department, as both departments are concerned in this matter. Mr. Farrow, who will devote his whole time to this work, had considerable commercial experience before taking up farming at Oakville some seven or eight years ago. In his farming operations he specialized in pure-bred stock and has been most successful in winning some of the big prizes of the big exhibitions.

The Board will have charge of the administration of the legislation both with regard to short-term and long-term loans. Short-term loans, it will be recalled, are to be made through local Farm Loan Associations, and the function of the Board will be mainly to see that these Associations are properly organized and supervise their business. In the matter of long-term loans, however, the Board will make the loans direct after securing a valuation of the property on which first mortgage is to be taken and securing adequate evidence as to the character and reliability of the borrower.

With these appointments the Act will be in operation in the near future. It only remains to decide on a source of money for loaning purposes and the rate of interest. Whether the short-term associations are to be financed through the banks or direct by the Government opening branches and taking deposits has not yet been determined, but an announcement on these points will, no doubt, be made in a short time and steps taken to give immediate effect to the legislation.

APPOINTMENTS AND STAFF CHANGES

OBITUARY

On September 10, Mr. F. W. L. Sladen, Dominion Apiarist, died of heart failure while bathing at Duck Island, Lake Ontario, where he was engaged in carrying on bee-breeding experiments.

Mr. Sladen, who was a native of England, joined the Experimental Farms staff in 1912, and afterwards became Dominion Apiarist. He devoted a large share of attention to queen-rearing and bee-breeding.

In 1919 a mating station was established on Duck Island, and isolated mating became an accomplished fact. During 1920 and 1921 a large number of queens were reared at Ottawa and transferred to the island for mating with drones of special breeding.

Excellent results were secured, and as an outcome, purely mated queens have been distributed to the Branch Farms and to beekeepers in different parts of the Dominion.

Other important phases of Mr. Sladen's work included a study of the Wild Bee and the Wasps of Canada, a study of the honey-producing plants from coast to coast, and the Wintering of Bees, a bulletin on which was published recently.

Mr. O. McConkey, B.S.A., has resigned his position as Agronomist at the Claresholm, Alberta, School of Agriculture, in order to take post graduate work in agronomy at the University of Illinois.

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Mr. W. A. DeLong, B.S.A., has been appointed Assistant in Chemistry at the Nova Scotia Agricultural College. He takes the position formerly held by Mr. J. G. Archibald, B.S.A. Mr. DeLong is a graduate of the O.A.C., Guelph, Ontario. Previous to his present appointment he was employed by the Alberta Department of Agriculture as Instructor in Science at the Raymond Agricultural School.

Mr. H. S. Cunningham, B.S.A., Professor of Agriculture and Farm Mechanics at the Nova Scotia Agricultural College, has taken over the Drainage work formerly in charge

of the late Mr. B. S. Landels, B.S.A. Since taking charge of this work Mr. Cunningham has been working on several large projects involving the drainage of several thousand acres.

Mr. R. J. Skelton, B.S.A., formerly of the staff of the Ontario Agricultural College, and late of the Soldier Settlement Board, has been appointed Field Enumerator in the Department of Poultry Husbandry of the University of British Columbia. For the present Mr. Skelton will be engaged in poultry farm survey work.

THE LIBRARY

LIST OF PRINCIPAL ACCESSIONS TO THE LIBRARY, INTERNATIONAL INSTITUTE BRANCH, DEPARTMENT OF AGRICULTURE, OTTAWA.

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List of References on the Marketing of Grain and Grain Exchanges. Washington, Library of Congress, 1921. 12 pp. mimeo.

Wheat Fields and Markets of the World, by R. E. Smith. St. Louis, Modern Miller Co., 1908. 418 pp.

Bacteria in Relation to Country Life, by J. G. Lipman, A.M., Ph.D., 6th ed. Toronto, Macmillan Co., 1921. 486 pp. ill.

Rural New York, by Elmer O. Fippin, B.Sc. (Agr.). Toronto, Macmillan Co. of Canada, 1921. 381 pp. (Rural State and Province Series.)

The Marketing of Whole Milk, by Henry E. Erdman, Ph.D. Toronto, The Macmillan Co. of Canada, 1921. 333 pp. (Citizens' Library, Marketing Series.)

Readings in Evolution, Genetics and Eugenics, by H. H. Newman. Chicago University Press, c 1921. 523 pp. ill., Bibl., pp. 510-14.

Australasian Sheep and Wool, by Alfred Hawkesworth, F.T.C. 5th ed. revised and enlarged. Sydney, William Brooks & Co., Ltd., 1920. 591 pp., ill.

Mountain Wild Flowers of Canada, by Julia W. Henshaw. Toronto, William Briggs, 1906. 384 pp., illus.

Goat-keeping for Milk Production, by C. J. Davies. London, offices of Country Life, 1920. (New York, Scribner.) 219 pp., ill.

Handbook of Australian Fungi, by M. C. Cooke, M.A., LL.D., A.L.S. London, Williams & Norgate, 1892. 457 pp., col. plates.

Quinby's New Beekeeping, by L. C. Root; new and revised ed. New York. O. Judd Co., 1919. 271 pp., illus.

Lighting the Home, by M. Luckiesh. New York, The Century Co., 1920. 289 pp., illus.

The Intelligence of School Children, by Lewis M. Terman. Boston, Houghton, Mifflin Co., 1919. 317 pp.

The Mechanistic Conception of Life: biological essays, by Jacques Loeb, M.D., Ph.D., Sc.D. Chicago, University Press, 1918. 232 pp., ill.

Plant Breeding: Comments on the Experiments of Nilsson and Burbank, by Hugo De Vries. Chicago, Open Court Publishing Co., 1919. 360 pp., ill.

American Rose Annual. Harrisburg, published by the American Rose Society. Issues for 1918, 1919, and 1920.

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Handbook of Chemistry and Physics, 8th ed., by C. D. Hodgman, assisted by M. F. Coolbaugh and C. E. Senseman. Cleveland, Chemical Rubber Co., 1920. 711 pp.

The Young Canadian Citizen: Studies in Civics, Economics, and Ethics, by J. O. Miller, D.C.L. Toronto, J. M. Dent & Sons, Ltd. 181 pp.

Gray's New Manual of Botany (7th ed.), a handbook of the flowering plants and ferns of the Central and Northeastern United States and adjacent Canada, rev. by B. L. Robinson and M. L. Fernald. New York, American Book Co., 1908. 926 pp., ill.

National Standard Squab Book, by Elmer C. Rice. Melrose Highlands, Mass., 1921. 416 pp.

Botany: The Story of Plant Life, by Julia McNair Wright. Philadelphia, Penn Publishing Co., 1915. 209 pp., illus.

The Community Center, by L. J. Hanifan. Boston, Silver, Burdett & Co., c 1920. 214 pp. (Teacher Training Series.)

Sewage and the Bacterial Purification of Sewage, by Samuel Rideal, D.Sc. (Lond.), 3rd ed. New York, Wiley, 1906. 355 pp.

House and Garden's Book of Gardens . . . ed. by Richardson Wright. New York, Conde, Nast & Co., 1921. 127 pp., illus.

An Empire View of the Empire Tangle (Imperial Conference, 1921), by E. O. Mousley, M.A., LL.B. London, P. S. King and Son, 1921. 87 pp.

Sanitation and Physiology, by John W. Ritchie. Yonkers-on-Hudson, N. Y. World Book Co., 1920. 308 pp., illus. (New-World Science Series.)

War Government of the British Dominions, by A. B. Keith, D.C.L., D.Litt. Washington, Carnegie Endowment for International Peace, 1921. 353 pp.

Agricultural Laboratory Manual—Soils, by E. S. Sell. New York, Ginn & Co., 1915. 40 pp.

Kansas Shorthorns: a History of the Breed in the State from 1857 to 1920, by G. A. Laude. Iola, Kansas, 1920. 647 pp., illus.

Pigeon Raising, by Alice Macleod. Cincinnati, Stewart & Kidd Co., c 1913. 113 pp.

Industrial and Power Alcohol . . . by R. C. Farmer. Toronto, Isaac Pitman & Sons, Ltd., 1921. 110 pp. (Pitman's Technical Primers.)

Farm Blacksmithing . . . by J. F. Friese. Peoria, Ill., Manual Arts Press, 1921. 92 pp. illus.

Climbing and Rambling Roses, by H. H. Thomas. Toronto, McClelland & Stewart, 1920. 78 pp., illus.

Radio-Activity, by Francis P. Venable, Ph.D., D.Sc., LL.D., Boston, D. C. Heath and Co., 1917. 54 pp.

History of the Kentucky Derby, 1875-1921, by John L. O'Connor. New York, 39 W. 17th St., 1921. 141 pp.

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THE AGRICULTURAL GAZETTE OF CANADA

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Report of the Dominion Cerealists, 1920-21, by C. E. Saunders, B.A., Ph.D., LL.D., Dominion Experimental Farms.

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Grande Prairie's Capabilities. Some Experimental Evidence, by W. D. Albright.—Pamphlet No. 29, Dominion Experimental Farms.

Mushroom Culture, by F. L. Drayton, Plant Pathologist.—Exhibition Circular No. 99, Dominion Experimental Farms.

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The Control of Bark-Beetle Outbreaks in British Columbia, by Ralph Hopping. Circular No. 15, Entomological Branch.

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The Canadian Record of Performance for Pure-bred Dairy Cattle, Report No. 13 for 1920-21.—Contains regulations, standards, and records of cows qualified for registration. Issued by the Live Stock Commissioner.

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QUEBEC

The Rotation of Crops Explained.—Bulletin No. 70, Field Husbandry Division, Department of Agriculture.

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Competition of Agricultural Merit for 1920. Report of the judges, 1st Region. Issued as a supplement to the Report of the Minister of Agriculture of the Province.

Report of the Quebec Society for the Protection of Plants, 1920-21.—This report, which is issued as a supplement to the Report of the Minister of Agriculture for the Province, contains an account of the thirteenth annual meeting of the Society, held at Macdonald College in March, 1921, together with the papers and addresses delivered thereat.

ONTARIO

Report of the Horticultural Societies, 1920.—Contains report of the Fifteenth Annual Convention of the Ontario Horticultural Association held at Toronto in February, 1921.—Ontario Department of Agriculture.

BRITISH COLUMBIA

Annual Report of the Department of Agriculture, 1920.

MISCELLANEOUS

Live Stock and Animal Products Statistics, 1920.—Contains statistical data relating to Live Stock, Meat and Dairy Products, International Trade and Prices, prepared by the International Trade Branch of the Dominion Bureau of Statistics in collaboration with the Department of Agriculture.

Historical Statistical Survey of Education in Canada.—Issued by the Dominion Bureau of Statistics, Education Statistics Branch.

This report is intended to serve as an introduction to a series of annual statistical reports to be issued according to the plan approved by the Conference of Dominion and Provincial officials on Education Statistics held in October, 1920. The present report deals with the following topics in eight sub-divisions, as follows:

Part I contains a necessary explanation of the varying terminology employed in the several provinces in regard to education, and a summary of provincial educational legislation and practice. In Part II will be found a general summary of Canadian education statistics, attention being specially directed to Table 1, a statistical summary of Canadian education for 1919. Part III contains an analysis of the distribution of pupils by grade, sex and age, its statistics thus having an important bearing on the questions of acceleration, retardation and elimination of pupils. The statistics of teachers, their qualifications, experience, and salaries, are treated in Part IV. Statistics of the education of adolescents in secondary and technical schools are given in Part V, which also includes a treatment of the growing movement for consolidated schools. The cost of education in the publicly controlled elementary and secondary schools of Canada is given by provinces in Part VI. Part VII, after a short treatment of the movement for medical inspection, furnishes statistics of the education of the blind and of deaf-mutes, and Part VIII gives the statistics of higher education in Canada, an interesting feature being Table 117, which classifies the students in Canadian universities and colleges by their provinces of residence.

The Clydesdale Stud Book of Canada, 1921, Volume 29.—Compiled in the Office of the Canadian National Live Stock Records, Ottawa, and published by The Clydesdale Horse Association of Canada.

The Canadian Hereford Herd Book, Volume 12, 1921.—Contains pedigrees 38234 to 41227 inclusive. Compiled by the Office of The Canadian National Live Stock Records, Ottawa, and published by the Canadian Hereford Breeders' Association.

Holstein-Friesian Herd Book, Volume 24, 1921.—Contains the record of all pedigrees approved and admitted for registry since the publication of the previous volume. W. A. Clemons, Secretary, Holstein-Friesian Association of Canada.

Tree-Planting on the Prairies of Manitoba, Saskatchewan and Alberta, by Norman M. Ross, B.S.A., B.A.—Bulletin No. 1 (revised) of the Forestry Branch, Department of the Interior, Ottawa.

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty,
International Institute Commissioner, Department of Agriculture,
West Block, Ottawa.

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

- 710.—Economic Wealth of Alsace-Lorraine—
*Comptes rendus de l'Académie d'Agriculture
de France*, Vol. VI, No. 14, pp. 354-360
Paris, April 14, 1920.

M. Meline presented to the academy M. Edmond Thery's book, *Richesses économiques de l'Alsace-Lorraine*, the chief object of which is to give a complete inventory of the resources of these departments. M. Thery lays a special stress on the wealth of the soil and subsoil of Alsace-Lorraine and sets forth the immense progress attained in agricultural production by the use of highly perfected methods of cultivation. He shows how from 1903-1912, the average yield had risen, for wheat from 27.5 bushels to 31.9 bushels per acre, for barley from 42 to 62.1 bushels, for oats 48.5 to 58.2 bushels, potatoes 206.6 to 237.4 bushels, alfalfa 2.8 to 3.4 tons.

To these general crops must be added special ones foremost among which comes that of the vine, which has placed Alsatian wines in the first rank; they have a flavour and bouquet equal to that of the best Rhenish wines. The Alsatian vineyards, in spite of the ravages of phylloxera, cover an area of about 64,220 acres, and produce some 180,000 hectolitres of wine.

To the cultivation of the vine must be added that of the hop, which covers some 9,880 acres, representing nearly 8 per cent of the world's production. The Alsatian hops are of first class quality. The cultivation of tobacco occupies about 9,000 planters and produces 92,080 cwts.

Breeding has made considerable progress in Alsace-Lorraine; from 1883 to 1912 it has steadily increased. During this period the number of cattle rose from 429,000 to 523,000 head, the number of pigs from 322,000 to 431,000, but that of horses alone

remained stationary and sheep had decreased. It is estimated that during this interval the value of the Alsatian herds had increased from \$47,000,000 to \$76,000,000 but this capital had been seriously encroached upon by the war.

The value of the forests has risen still higher. Inspector-General Lafosse estimates the value of the demesial forests of Alsace-Lorraine at not less than \$96,000,000, with an average value of \$240 per acre, but these are the prices of 1917 and the present value of the forests would be more than \$160,000,000.

The subsoil of Alsace-Lorraine is perhaps, considering its small area, the richest in the world for the importance and value of its deposits. The principal mineral is iron ore in the celebrated basin of Longwy-Bricy, which enables France to add to the 18 million tons of ore from the basins of Briey and Longwy which she already possessed and 20 million metric tons from Lorraine and thus to become with the United States the richest country in the world as regards iron ore. The deposits of potash in Alsace are estimated to contain 250 million metric tons.

- 613.—The Nutritive Value of Yeast Protein.—OSBORNE, T. B., AND MENDEL, L. B., with the co-operation of FERRY, E. L., and WAKEMAN, A. J., in *The Journal of Biological Chemistry*, Vol. XXXVIII, No. 2, pp. 223-227. Baltimore, Md., June, 1919.

The idea of using yeast as a source of food protein for man and the higher animals is not new, although it has been given renewed emphasis through the war. It also presents the possibility of a synthetic production of protein from exceptionally simple compounds, and in addition, its use in supplying water-soluble vitamins was recently

demonstrated (*Journal of Biological Chemistry*, Vol. XXXI, p. 149, 1917; *American Journal of Physiology* Vol. XLV, p. 431, 1918). Although the statements on this point are not in uniform agreement, it has repeatedly been found that in the case of both adult men and animals, the utilization of the nitrogenous components of yeast, as judged by the coefficient of digestibility and by the nitrogen balance is good. Feeding experiments with growing animals with the most exacting requirements for physiologically adequate protein are particularly useful for determining the utility nitrogenous nutrients. Apparently, there are no records of prolonged growth when yeast was the sole source of protein. Owing to this the authors kept rats for more than a year upon a diet in which yeast was the sole source of nitrogen as well as water-soluble vitamine. The results showed a nitrogen utilization in several cases of 74 to 83 per cent. The fact that animals can tolerate such large quantities of a food product so unique as yeast, obviously indicates that toxic substances must be excluded. In other experiments in which yeast was used solely as a source of water-soluble vitamine, the animals grew vigorously to adult size, but were sterile, with a very few exceptions, as the tests showed an absence of germ cells.

Other investigators have described similar conditions among animals fed on diets deficient in water-soluble vitamine.

615.—The Distribution of Water-Soluble Vitamine.—OSBORNE, T. B. and MENDEL, L. B., with the co-operation of FERRY, E. L., and WAKEMAN, A. J., in the *Journal of Biological Chemistry*, Vol. XXXIX, No. 1, pp. 29-34. Baltimore, Md., August, 1919.

The water-soluble vitamine is widely distributed in ordinary food products and it is also present in cottonseed, millet seed, flaxseed, Kafir corn, hempseed, cabbage, alfalfa, clover, timothy, spinach, potato, carrot, and cocoanut meal. To this list the authors added the onion bulb, turnip root, the leaves, stem and roots of the beet, and the tomato fruit.

It is also important to know the comparative value of the different natural foods with regard to water-soluble vitamine and nutrition, and the authors have conducted experiments with this in view.

To permit more accurate comparisons of the water-soluble vitamine content of natural foods, the procedure adopted consisted in feeding each day small, known quantities of the vegetable product under investigation, apart from the basal ration which was fed *ad lib*. In this way the effects of the different food substances could be compared, based on the water-soluble vitamine content. It was found that the

samples of clover, alfalfa, and timothy hays used to furnish the water-soluble vitamine were much less efficient than the dried immature specimens. The fact that this difference exists, may have importance in feeding young animals and dairy cows. Consequently the authors advise that hay made from immature clover or alfalfa be used to replace a part at least of the milk fed to young stock, whilst the hay ordinarily given to dairy cattle should be replaced by that from less mature plants.

832.—Horticultural Exhibition and Garden Competitions.—MULFORD, F. L. in *U. S. Department of Agriculture, Department Circular* No. 62, pp. 1-38, Washington, Oct., 1919.

The author who is associated with the Bureau of Plant Industry, United States Department of Agriculture, discusses horticultural exhibits from the following points of view: Organization; competitors; classification; various kinds of shows; arrangement of exhibits and methods of judging (score card method); prizes; rules (examples are quoted). The author concludes by a brief survey of garden competitions, and gives also an outline of the schedule system advised.

CROPS AND CULTIVATION

834.—Cultivation does not Increase the Rainfall in the Great Plains States.—SMITH, J. W., in *Monthly Weather Review*, Vol. 47, No. 12, pp. 858-860. Washington, D.C., December, 1919.

It has been the general opinion amongst the farmers in the Great Plains States that the amount of land under cultivation influences the rainfall increase.

The author refutes this idea after taking note of numerous records.

The average precipitation in the northern Great Plains during the period 1868 to 1917 is recorded as follows:

1868-1877.....	19.8 in.
1878-1887.....	20.4 "
1888-1897.....	18.6 "
1898-1907.....	19.5 "
1908-1917.....	19.1 "

In the Central Great Plains:

1868-1877.....	16.3 in.
1878-1887.....	20.4 "
1888-1897.....	17.6 "
1898-1907.....	20.2 "
1909-1917.....	18.2 "

The data with reference to the southern and western States are analogous. There are well defined sequences of dry and wet years, but there has been no progressive increase or decrease.

496.—**Irrigation of Field Crops: Experiments in Nevada, U.S.A.**—KNIGHT, C. S., and HARDMAN, C., in Bulletin No. 96, *Agricultural Experiment Station, University of Nevada*, pp. 42, Carson City, Nevada, 1919.

Discussion of the methods of irrigation used in Nevada; water supply and area irrigated by the State; factors affecting the results of irrigation water; description of experiments on irrigated field crops including alfalfa, wheat, potatoes, red clover and sugar beet.

In 1918, 900,000 acres or about 1.3 per cent of the area of Nevada was irrigated, and produced approximately some 145,000 acres of alfalfa, 80,000 acres of wheat and 15,000 acres of potatoes. The chief rivers that supply irrigation water are the Humboldt, Truckee, Carson, Walker, and Muddy; the Humboldt waters over half the irrigated area.

Most of the alfalfa and cereals acreage is irrigated by flooding, while potatoes and other hoed crops are irrigated by means of irrigation furrows.

The chief factors that influence the effect of the irrigation water are the type of soil, its topography, the presence of a crust near the surface, the annual rainfall, and evaporation. The soil type causes more variation in the quantity of water required for irrigation than any other factor.

The average results of the experiments made with alfalfa during the period 1906-1911 show that with a total consumption of 3.27 acre feet of irrigation water, a yield of 5.93 tons of hay per acre is obtained. In the 5-year period 1914-1918, there was not sufficient rainfall during the growing period to influence the soil-moisture content of the soil. When irrigation was delayed until the alfalfa began to wither, the unit yield was relatively low; there was, however, a very high yield when irrigation was practised when the plants had only assumed a dark colour. The most economic irrigation for alfalfa was accomplished with a total irrigation of 3.5 feet of water, each time the plants showed need of water by turning dark green in colour.

Soil moisture determinations showed that, with an irrigation of 6 in. of water, 70 per cent of it was retained in the first 4 feet of soil; but with this, the lowest crop per unit volume of water consumed was obtained, or 6.18 tons of hay per acre for an 81 inch layer of water. Soil moisture determinations also showed that only 25 per cent of a layer of 12 inches of water was retained by a surface layer of soil 4 feet deep. In irrigated alfalfa fields, the decrease of the soil moisture content at mowing time was generally greater when 9 and 12 inches of water were given, while the total quantity of irrigation

water retained in the soil was greatest at the time of the two last periods of wilting.

In experiments made with wheat during the 5-year period 1914-1918, 3 and 7 inches was given two or more of the typical growth periods, i.e., appearance of the fifth leaf, ear formation, flowering, milky consistency of the grains, pasty consistency. The maximum yield was obtained with 28 inches of water in four applications, omitting that of the period when the fifth leaf appeared. The maximum yield with 3 irrigations was obtained with 21 inches of water, omitting the irrigations given during the first and last of the above-mentioned 5 periods. The average yields of wheat were considerably higher when 7 inches of water was given than with 3 inches at each irrigation. The yields were relatively low when the irrigations of the ear-formation and flowering periods were omitted, which shows a very critical period for wheat as regards its need for water, between ear formation and the period when the seeds are of a milky consistency. The highest yield was obtained by giving 9 inches of water in 2 irrigations, one before and one after earing. High unit yields were usually accompanied by the greatest decrease in the soil moisture content at harvest time compared with the soil moisture content before the first irrigation.

In the experiments with potatoes, continued during the 4-year period 1914-1917, the heaviest crop was obtained with a total irrigation of 16.5 inches of water, distributed in 3 inch applications when the plants showed a tendency to wilt.

Irrigation experiments with clover showed a gradual decrease in yield as the wilting period of the plants advanced at the time of irrigation.

Sugar beets gave the heaviest crop with 18-inches of water in 3-inch applications.

The results show, generally speaking, that the most economical use of water consisted in giving a total of 3.5 feet at the rate of 6 inches per time for alfalfa and clover; with a total of 2.3 feet in 3 inches a time for application for wheat with a total of 1.5 feet in 3-inch applications for potatoes and sugar beets. When alfalfa is used for autumn pasture after the last mowing, usually an extra irrigation is required after the last harvest.

626.—**Carbonication or Manuring with Carbon Dioxide.**—I. GERLACH, Kohlen-säuredüngung, in *Mitteilungen der Deutschen Landwirtschafts-Gesellschaft*, Year XXXIV, No. 6, pp. 77-82. Berlin, 1919.—II. RIEDEL, F., Die Anwendung der Kohlen-säuredüngung in grossen. *Ibid.*, Nos. 32-34-35, pp. 429, 451-455, 467-469.—III. *Ibid.*, in *Tonindustrie Zeitung*, Year XLIII pp. 607-619. Berlin, 1919.—IV. *Ibid.*, Die Ausnutzung der Kochofenabgase

zur Kohlensäureddung, in Stahl und Eisen, Year XXXIX, pp. 1497-1508. Essen a.d. Ruhr, 1919.—V. Ibid, Verfahren und Einrichtung zur Ausnutzung Kohlensäurehaltiger, unereiner Gase oder Abgase. (D.R.P. 316637, K1. 806), in *Chemisches Zentralblatt*, Vol. I-II, No. 8, Techn. Teil., p. 334. Berlin, 1920.—VI. GEHRING, A., Ddungung mit Kohlensäure, in *Umschau*, Year XXXIII, pp. 809-813, Berlin, 1919.—VII. BLOCK, B., Die Verwendung der Kalkofengase zur Kohlensäureddung, in *Deutsche Zuckerindustrie*, Year XCIV, pp. 399-401, Berlin, 1919.

I.—FISCHER, R. (*Gartenflora* pp. 298-1912) and others have previously demonstrated the possibility of increasing the yields of crops by augmenting the amount of carbon dioxide in the air. Gerlach, resuming these experiments at the Agricultural Institute at Bromberg, obtained on an average, in 1918 the following results (Table I), comparing crops in open field with crops in glass cases in small greenhouses with or without the introduction of carbon dioxide.

The extra yield in the open field may be attributed to cloudy weather, but the data for the lettuce are not reliable, as there was only a single plant in each pot. Nevertheless, according to these experiments, a positive action of carbonication cannot be denied, but Gerlach asks if the results are sufficiently important to justify practical use without first waiting for further confirmation by later experiments.

II-VII.—Besides this, Riedel observed that out of 100 parts of organic plant tissue one-half is composed of carbon, in this way:

Although up till 1860 it was believed *ab antiquo* that plants were able to feed themselves organically, that is to say on carbon from the soil humus, Liebig's theory or carbon dioxide assimilation from the atmosphere was accepted, without however attributing any importance to the fact that the air contains barely 0.3 per cent of carbon dioxide and that the marked development of vegetation in the carboniferous period, which led to the formation of the coal measures now utilized by man, may be attributed to the larger quantity of carbon dioxide then present in the atmosphere. Taking this into consideration, Riedel worked out a method of applying carbon dioxide by utilizing gases produced by combustion rich in this compound. These gases are available in large quantities, especially in the metallurgical industry. With this in view the *Deutsch-Luxemburgische Bergwerks und Hütten A. G.* of Dortmund took up the author's proposition, and made an experimental apparatus. Thus, in the spring of 1917, 3 glass houses 19.68 feet wide by 81 feet long were constructed, and 2 of these

were used for comparative experiments. Burnt and purified blast-furnace gas was introduced through a double set of perforated pipes running round one of the glass houses.

Percentage of dry matter of crops grown in open and also from plants grown under cover with addition of carbon-dioxide.

Crops	In open field	Under cover +CO ²
	%	%
Oats.....	+ 8	+15 to 20
White Mustard.....	+11	+18
Carrots.....	+25	+ 4
Runner Beans.....	+60	+ 6
Blue Lupin.....	+35	+14
Tagetes.....	+19	+31
Phlox.....	+41	+47
Heliotrope.....	+ 8	+37
Lettuce.....	+50	-31

—	Water	Mineral content	Nitrogen	Hydrogen and oxygen	Carbon
	%	%	%	%	%
Potato tubers	75	1	0.3	12	11.7
Rye, seed....	13.4	2	1.8	41.8	41.0

The other, on the contrary, better exposed, received no carbon dioxide. The addition of carbon dioxide apparently produced a surplus yield equal to 2½ times the control in the case of tomatoes, and to 1.7 times in the case of cucumbers. Riedel also arranged a scheme for the treatment of plants in the open with carbon dioxide. For this purpose, he set out square plots surrounded by perforated cement pipes through which the residual blast-furnace gas was passed; at the same time an untreated field with a similar sandy loam soil served as a control. The results obtained with crops treated with carbon dioxide were as follows:

Spinach.....	2.5	times the yield of the control plot
Beets.....	1.5	" " "
Potatoes.....	2.8	" " "
Lupines—		
green.....	2.74	" " "
dry.....	2.9	" " "
Barley.....	2.0	" " "

In 1918, the work was extended and the same interesting results were obtained; the surplus yield due to the carbon dioxide treatment was 2.3 times for the tomatoes under glass; in the open field, potatoes treated

in a similar manner gave a yield 4 times as high and beets gave the following results:

—	With CO ²	Without CO ²	Ratio
	kg.	kg.	
Plot of 1 sq. metre area + manure + fertilizer one application.....	2.8	3.9	1:1.40
Plot of 1 sq. m. area + manure + fertilizer, double application....	3.3	5.1	1:1.54
Ratio.....	1:1.18	1:1.30	.....

It appears from this that the addition of carbon dioxide would prove useful also to the other manuring of the soil.

To complete these experiments, the treated air was analyzed in order to determine the amount of carbon dioxide absorbed in glass houses containing tomatoes and in others that were not cultivated. In the first case, after stopping the inflow of carbon dioxide, the content fell to 0.1 to 0.2 per cent, and in the second case, 0.42 to 0.65 per cent, compared with 1 per cent at the start.

According to Riedel, these tests give a positive answer to the question raised by Gerlach namely that the addition of carbon dioxide contributes to a marked extent towards plant development, because the ordinary content of carbon dioxide in the atmosphere does not constitute an optimum. The unsuccessful results should be attributed to unfavourable experimental conditions or to other exceptional causes.

Another question must be asked: Can sufficient quantities of carbon dioxide at a reasonable price be obtained for fertilizing purposes? With the hope that this problem may be successfully solved, the future of agriculture assumes a bright aspect. It is obvious that compressed carbon dioxide can not be employed as in previous experiments for this purpose except in case of absolute necessity, as such a method is too expensive and inadvisable. Quite apart from the possibility of considerably reducing the consumption of carbon dioxide, there are sufficient sources from whence the gas can be obtained cheaply.

Without taking into account the many combustion gases which require special treatment for the elimination of harmful ingredients, blast-furnace gases constitute a convenient source of carbon dioxide. These gases contain, it is true, carbon monoxide, but, at normal concentration, it is

not injurious to plants, and it is in the interests of heating economy to reduce the content as much as possible.

Other harmful constituents of blast-furnace gases are usually eliminated in most plants, in order to avoid injury to the apparatus. In several cases, the gases still contain sufficient heat to warm glass houses to a large extent. The exhaust gas from gas engines should be especially useful, as it is under pressure, and therefore does not require machinery to distribute it, particularly if it has to travel several kilometres; a network of piping will be sufficient. As regards the amount of blast furnace gas available, it must be remembered that a furnace charged with 100 tons of coke burns 85 tons of carbon, capable of producing 320 tons of vegetable matter such as potatoes. In Germany, before the war, the siderurgical works used 4,000 tons of coke daily in the blast furnaces, and produced 35 million cubic metres of gas with 20 per cent of carbon dioxide per day. The lime kilns, as well as sugar refineries could also supply carbon dioxide.

The time will come, according to Riedel, when there will be special installations for supplying carbon dioxide for agricultural purposes, just as there are now special plants for the distribution of electric power. This possibility depends on a question of development which cannot be settled in a moment, but which will no doubt be cleared up when conditions are more favourable. Although it is possible that Germany may be able to obtain sufficient industrial carbon dioxide to give increased yields capable of covering the deficit in agricultural crops, until the time when this can be realized, great importance should be attached to organic manures as a source of carbon dioxide for plants. Considering that an increase in the foliar surface necessitates a greater absorption of carbon dioxide, all organic residue matter available should be collected in order to help in the formation of mould.

In conclusion, Riedel quotes the opinion of a German Horticultural Inspector, to the effect that the use of carbon dioxide as manure can hardly be neglected, as it constitutes, like nitrogen, phosphates and potash, an important factor in plant nourishment. (1)

497.—The Preservation of Liquid Manure.

KRISTENSEN, R. K., in the *Tidschrift for Planteavl*, Vol. XXVI, Pt. 3, pp. 485-490. Copenhagen, 1919.

The Danish State Agricultural Experiment Station at Askov has carried out experi-

(1) In the United States, Cummings, M.B. and Jones, C. H. (*Journal of the Chemical Society*, Vols. 117-118, No. 689, Pt. I, p. 267. March, 1920), in carrying out experiments with a current of carbon dioxide under glass (boxes or frames) have obtained favourable results with peas, potatoes, strawberries, and lettuce, but not with radishes, which, however, matured early. In most cases, the plants grown with carbon dioxide showed a higher carbohydrate content and a lower protein content. Lettuce benefited the most when given 300 litres of carbon dioxide per day in boxes 130×70×30 cm. (Ed.).

ments on the preservation of liquid manure by adding sulphuric acid or superphosphate.

The liquid manure used contained 0.478 per cent of nitrogen, of which 0.418 per cent was present as ammonia. It was placed in porcelain dishes and evaporated on a water-bath; a series of 5 cc. samples was treated with from 0 to 32.5 cc. of decinormal sulphuric acid and with 0.1 to 1.5-gm. of 18 per cent superphosphate.

The results obtained showed that two-thirds of the acid used was retained by the ammonia, and the rest by the other bases. Very small quantities of acid had practically no effect on the conservation of the ammonia; in order to fix all that contained in the 5 cc. sample, 1.3 gm. of superphosphate or 22.5 cc. of decinormal sulphuric acid was required.

498.—Experiments and Researches on "Tetraphosphate".—MENOZZI, A., in the *Giornale di Chimica Industriale*, Year II, No. I, pp. 8-9. Milan, January, 1920.

Some four years ago, a product called "tetraphosphate", made and marketed by a company bearing the same name, gave rise to a large number of publications and to much discussion. Publications in its favour upheld and still uphold that it has the same fertilizing value as superphosphate, but without the acidity of that product which is so injurious to certain soils and harmful to the bags, and that it provides phosphoric acid at a cheaper rate than superphosphate. After detailed discussion the article concludes: The yields obtained in 1917-18 show that:—phosphorite and tetraphosphate always produced a little more than the control with phosphatic fertilizer; that both were always inferior to superphosphate; that there were only slight differences between phosphorite and tetraphosphate, and these mostly came within the limits of experimental error.

722.—Sulphuric Acid and Fertilizers.—BAUMANN, in the *Chemiker Zeitung*, Year XLIV, No. 55, pp. 346-347. Kothen, May 6, 1920.

The present scarcity of the raw materials required by the chemical industry naturally gives rise to restrictive measures, so that the riches of the soil have to be used with more foresight now than before the war. A typical example of this is afforded by the sulphur and pyrites employed in the manufacture of sulphuric acid. The author has devoted his attention to the use of sulphuric acid in the production of the two main classes of chemical products, viz., phosphatic, and nitrogenous compounds. On the occasion of the celebration of the 25th

Anniversary of the Union of German Fertilizer Manufacturers, on Jan. 26, 1905, attention had already been called to the great problem, still unsolved, of the fertilizer industry and the dry treatment of phosphates without acids with a view to rendering them more available. Although the full economic importance of the question was not then realized, nevertheless experiments were undertaken for the purpose of partially or wholly eliminating the use of sulphuric acid in the phosphatic fertilizer industry.

From the statistics on fertilizers published by the *International Institute of Agriculture*, it is possible to calculate the pre-war consumption of sulphuric acid in the production of the above-mentioned class of fertilizers as follows:—

	Metric tons
World production of sulphuric acid.....	5,000,000
European production of sulphuric acid.....	3,700,000
World production of superphosphate.....	7,500,000
Corresponding world consumption of sulphuric acid.....	3,000,000
European production of superphosphate.....	5,600,000
Corresponding European consumption of sulphuric acid.....	2,240,000
World production of sulphate of ammonia.....	1,057,000
Corresponding world consumption of sulphuric acid.....	793,000
European production of sulphate of ammonia.....	941,000
Corresponding European consumption of sulphuric acid.....	710,000
Percentage of the world production of sulphuric acid used for superphosphate.....	60%
Idem of the European consumption.....	65%
Idem of the world production used for sulphate of ammonia..	16%
Idem of the European production.....	19%

These figures show that $\frac{3}{4}$ of the world production of sulphuric acid is completely lost in the soil, when either superphosphate or sulphate of ammonia are used, and at the present moment, we have no right to waste such an enormous quantity of sulphuric acid.

844.—New Types of Basic Slag for Sale in the British Isles.—The Rothamsted Experiment Station in *The Journal of the Board of Agriculture*, Vol. XXVI, No. 8, pp. 829-830, London, 1919.

There are distinct types of basic slag on sale in the British Isles which must on no account be confused.

1. BESSEMER slag, containing phosphoric acid equivalent to 40 per cent or more of tricalcic phosphate, largely soluble in 2 per cent citric acid: usually 80 per cent of the total is guaranteed soluble.

2. Basic "open hearth", containing less phosphoric acid, equivalent to 15 to 31 per cent of tricalcic phosphate, largely soluble (80 per cent) in a 2 per cent citric acid, the first pourings being richer than the last.

3. *Idem*, made by the use of lime and fluorspar, containing as much phosphate as the poor grades of the preceding class, but only slightly soluble (20 per cent or less) in 2 per cent citric acid.

The first of these 3 types, the Bessemer slag, is the fertilizer which for many years was well known to farmers as one of the most effective fertilizers for pasture land. The second and third types have come into prominence in recent years, especially during the war, as a result of changes in the method of making steel. At first sight these two new types do not appear very promising agriculturally, but field experiments have shown that they possess distinct value. Experiments conducted in 4 counties by 4 different experimentors demonstrated that the second type has proved substantially equal in fertilizer value to the old Bessemer slags, when compared on equal phosphate content. The third type proved more effective than was at first assumed from their low solubility in citric acid (2 per cent). When the growing season has been sufficiently long, these slags have proved approximately as useful as the others, in spite of their low solubility.

With reference to the question as to whether the poor slags are worth as high a price as the rich, although it cannot be denied that the value of slag lies in other constituents apart from phosphates, it is safest however in accordance with present knowledge to adopt the plan of judging the new slags on their phosphatic content, that is to say, according to the unit system, and the degree of fineness. Having allowed for this, there is probably no justification for paying more for the 40 per cent slag than for the others.

729.—Formaldehyde Treatment of Maize Seed.—RICHEY, F. D., in the *Journal of the American Society of Agronomy*, Vol. XII, No. 1, pp. 39-43. Washington, D.C., Jan., 1920.

The author observed the effect on the germination of maize seed, of treatment with formaldehyde solutions of different strengths and for different periods, with a view to preventing the growth of fungi on seedlings grown in water cultures. Samples were tested for germination, both in water cultures and in sand. Treatment

of maize with solutions of 5, 15 and 25 cc. of formaldehyde per litre materially reduced the development of the seedlings grown in water culture. The vitality of the seed, as evidenced by the development of the seedlings in either water culture or sand, was not affected by treatment with a solution of 5 cc. of formaldehyde per litre. Treatment with the solution of 15 cc. of formaldehyde per litre did not materially affect the seedlings grown in water culture, but nevertheless was injurious to germination and development in sand. Treatment with 25 cc. per litre was markedly injurious. Soaking maize for 2 hours in a solution of 5 cc. formaldehyde in 995 cc. of water, followed by a fumigation period from 2 to 24 hours in length, can therefore be recommended for checking the development of fungi, without interfering with the normal development of seedlings in water cultures.

741.—Topping of Wheat Liable to Lodging.—I. SCHRIBAUX, II. BACHELIER, in *Comptes rendus de l'Académie d'Agriculture de France*, Vol. VI, No. 14, pp. 360-365. Paris, April 14, 1920.

I.—M. Schribaux describes a definite means, not only of dealing with lodging, but for utilizing the vigour of growth of wheat to increase the grain yield at the expense of the straw yield.

When the wheat shows signs of bearing and measures about 12 inches, it is sufficient to cut back to 6 inches, *i.e.*, to half its normal height. When the plant again reaches a height of 8 inches, it is advisable to cut back a second time to 6 inches if it still appears liable to lodging; this second treatment is hardly ever necessary. By this means, the entire wheat crop is rendered resistant to lodging, whatever the height, and 12 and 6 inches are the recognized figures which it is wise to observe as nearly as possible. If the wheat obviously exceeded 8 inches in height, one must take the risk of topping, anyhow to a small extent, the young ears, which are still enclosed in the sheath.

The practice of topping, first pointed out by M. Hanicotte, farmer and former President of the Syndicate of Agricultural Distillers in the North, is at the present time a generally recognized procedure on the best farms in the north of France. On small areas, the wheat is cut with the scythe or sickle; in the neighbourhood of Paris, a header is employed, which is a kind of very light sickle with a blade which can be lifted to at least 6 inches. This same implement, manufactured by Garnier, at Mormant (Seine-et-Marne), is also used for destroying weeds amongst the wheat.

Topping delays ripening for some days and somewhat reduces the straw yield, but, on the other hand, the quantity and

quality of the grain yield is improved. A field thus treated gave the lowest proportion of dwarfed wheat. The cause is easily explicable; the topping which can be compared to the pinching practised by gardeners has the effect of equalizing the development of the tillers. The more advanced are retarded in growth to the advantage of the smaller ones, not reached with the sickle; the latter which would have only given small tiller growths, take the same time to mature as the older ones.

In order to show the various advantages of topping, M. Schribaux gives a brief *résumé* of a paper read some time ago (1909) before the National Agricultural Society, by M. Bachelier. M. Bachelier had cut back wheat covering an area of 61.75 acres sown after alfalfa, leaving a control plot of 32.8 feet untouched for comparison purposes. In the area treated, M. Bachelier obtained an increased yield of 1,400 lbs. of grain and a decreased yield of 1,540 lbs. of straw per acre.

What expenses are entailed by this operation? The machine used cost \$90 (pre-war prices). The cost of upkeep is negligible, as the blade is held too far away from the soil to encounter obstacles. An area of 9.8 acres can be covered in a day by a man and a horse. This expense, plus the value of at least 13.7 cwt. of hay, is largely compensated for by the decrease in the cost of harvesting and the superior quality of the produce.

The idea of topping is almost as old as the cultivation of wheat, but M. Hanicotte has the merit of having perfected it.

This method is equally successful with oats but the operation is not so easy as with wheat. As oats grow very quickly, the time allowed for performing this operation is very limited. By delaying the treatment there is a risk of letting the plant get too tall, and of injuring the panicle, still enclosed in the sheath, and consequently of damaging the production of grain.

II. M. Bachelier considers that there is no reason to fear that, even in case of drought, topping will damage the crop yield.

In order to apply this process to hardy wheats, it is absolutely necessary to choose the right moment when the upper part of the leaves can be clipped without touching the stalk. The whole success of the operation depends on this precaution.

With the Garnier, it is possible to cut back 9.8 acres per day. The machine consists of a kind of shears with a detachable blade which can be regulated to the height of the wheat. This blade is lighter than that of a mower. It is necessary to work quickly, as the period when it is possible to cut back wheat is very limited. Topping slightly

reduces the height of the stalks and makes the plant resistant to lodging.

751.—Food and Fodder Plants.—HOLLAND, J. H., in the *Royal Botanic Gardens, Kew, Bulletin of Miscellaneous Information*, Nos. 1 and 2, pp. 1-84. London, 1919.

Description of the most important food and fodder plants included in the Natural Orders: *Leguminosæ*, *Gramineæ*, *Cruciferae*, and *Rosaceæ*, etc.

For each plant the author gives the chief countries of production, imports into the United Kingdom, the approximate production of some of the principal crops in the United Kingdom, brief details as to uses, and other notes of practical interest.(1)

633.—Studies in the Pollination of Indian Crops, and the Possibility of Improvement by Selection.—HOWARD, A., HOWARD G., and ABDUR RAHMAN KHAN, in *Memoirs of the Department of Agriculture in India*, Vol. X, No. 5, pp. 195-220. Calcutta, Dec., 1919.

635.—"Pusa No. 4", Indian Wheat Variety Imported into France Because of its Early Maturity and Resistance to Scorching.—SEVERIN, R., in *Comptes rendus des seances de l'Academie d'Agriculture de France*, Vol. VI, No. 12, pp. 313 and 324-325. Paris, March, 1920.

The author presented to the Academy some ears of the Pusa No. 4 wheat variety selected by Prof. Howard of the Cereal Station of the University of Pusa. This wheat has the characteristics of rapid growth and of carrying its grain normally until mature, even if sown very late after the last rains, or if there is no rainfall from sowing time until harvest. This was proved at Vaucluse by M. Brulat, in spite of a persistent northwest wind after the sowing at the end of March, followed by an exceptional drought during the summer of 1919; also at Toulouse by Prof. Rives, at the University Agricultural Institute, and at Bagnols-sur-Garonne, by M. Rouart (sown on April 5), and also on the author's own trial plots at Clos-l'Arat, Fontet, near Reole (Gironde). The ears taken from these cultures were ripe in 90 days.

Several other varieties of Indian wheat with a rather less fine grain sown in the spring of 1919, escaped the rust which ruined the autumn sown varieties in 1918, and gave results which the author hopes to confirm this year. The author is also testing further samples from the Experiment Stations in

(1) The International Institute Library has these Bulletins of the Kew Gardens, and they will be loaned to anyone desiring them (Ed.).

Australia and the United States, bearing in mind the fact that the Indian wheats are particularly resistant to drought, and excess of moisture, and are thus valuable for improving wheats in countries that suffer from excessive heat and dryness.

513.—Improvement of Sugar Beet by Selection, in France.—Gaillet, M., in *Comptes rendus des Seances de l'Academie l'Agriculture de France*, Vol. V. No. 39, pp. 986-995. Paris, Dec., 1919.

529.—Action of Heat on Sugar-Beet Seed.—Saillard, E., in *Comptes rendus des Seances de l'Academie d'Agriculture de France*, Vol. VI, No. II, pp. 308-311, Paris, March 17, 1920.

535.—Planting Trees on Waste Heaps, Abandoned Quarries and Land in Belgium.—CRAHAY, N. I., in the *Bulletin de la Societe Centrale Forestiere de Belgique*, Year XXVII, No. 3, pp. 117-131. Brussels, March, 1920.

536.—The Eco-Dendrological Problem of the Production of Forest Seeds.—BORGHE SANI, G., in *Rivista de Biologia*, Vol. I, Pt. 5-6, pp. 559-585. Bibliography of 63 publications. Rome, 1919.

LIVE STOCK AND BREEDING

897.—An Experiment with Fattening Pigs to Compare Cooked with Raw Potatoes.—Department of Agriculture and Technical Instruction for Ireland Journal, Vol. XX, No. 2, pp. 190-193. Dublin, 1920.

The high cost of fuel, of manual labour, etc., has been the reason why many farmers hesitate to undertake the fattening of pigs with cooked food, especially potatoes, which, however, is a customary proceeding in Ireland. The Department of Agriculture has therefore undertaken a series of tests in order to ascertain if it is possible to fatten pigs successfully on a diet of raw potatoes. These tests were carried out at five centres, and at each centre the pigs were divided into 2 lots, as far as possible homologous in appearance, and the total number of pigs was 34. The average age of the pigs at the commencement of the tests was 15 weeks and the tests covered a period of 110 days.

Lot 1 was given cooked potatoes; Lot 2 raw pulped potatoes. In all other respects the two lots were treated alike. The two lots consumed the same quantity of feed.

Results show that the 17 pigs which received cooked potatoes made an increased gain in live weight of almost 16 lbs. per head (equals a total gain of 266 lbs.) as compared with the 17 pigs which received

raw potatoes. Naturally, against the pigs which were fed on cooked potatoes must be set the cost incurred in cooking the latter. Nevertheless, taking into account the market conditions when the experiment was made, the value of the increased live weight was obviously superior to the expenses incurred in cooking the potatoes, and the following conclusions may be drawn:

(1) At the present price of pork a substantial profit is obtained by the cooking of potatoes for fattening pigs.

(2) Moderately good results may be obtained from the use of raw potatoes; but in this case the fattening period is extended.

781.—The Pigeon as a Means of Increasing the Food Supply.—BENEDETTI, I., in the *Giornale degli Allevatori*, Year XVI, No. 14, p. 108. Catania, May 20, 1920.

The author recommends pigeon-rearing for the rapid production of meat. The ordinary breed of pigeons should be chosen, for it is the most profitable, as from 20 to 24 young are produced annually.

Taking his own experiences in pigeon-breeding as a basis he calculates the profits of one financial year as follows:

Installation.—In order to set up a small pigeon-breeding establishment, it is necessary to have 100 pigeons ready for breeding; 50 suitable breeding boxes; 100 glazed earthenware nests; 4 zinc syphon drinking troughs; 8 special feeding-boxes to prevent the food being scattered or soiled; boxes for ashes, rubbish, straw, etc., other objects such as perches, apparatus for disinfection, small ladders, etc., the transformation of a room with an area of 16 x 13 feet and 11 feet, 6 inches in height, including the external cage into a pigeon loft; labour for putting in the boxes; other expenses.

FARM ENGINEERING

859.—A Turbine Sorter for Seeds.—I. RINGELMANN, Selection des bles au trieur, *Comptes rendus de l'Academie d'Agriculture*, Vol. VI, No. 19, pp. 477-478. Paris, May, 1920.—II. ZACHAREWICZ, Ed., *Ibid*, pp. 489-491.

M. Ringelmann reports the opinion of the Rural Engineering Section as regards M. Zacharewicz's suggestion of using a turbine sorter for seed-wheat.

The ordinary sorter divides the seeds according to their length and width, but without any regard to their weight, which is a third very important character in wheat used for sowing.

The Marot turbine sorter allows of bad, light grains being separated from good seeds, which are of the same size.

The so-called air-turbine, or turbine fan, can be affixed to all sorters, and has nothing to do with the small fans or winnowing machines, that merely remove the dust, husks, and chaff.

The results obtained by M. Zacharewicz with Manitoba wheat are given below:

—	Weight per bushel	Proportion
	lbs.	
Before sorting.....	62.4	100.00
Sorted with ordinary sorter (without turbine).....	63.6	101.92
Sorted with turbine-sorter....	64.0	102.56

The ordinary sorter gives an increase of weight, per unit of volume, of 1.92 per cent with grain that has not yet been passed through the machine; the increase in weight due to the action of the turbine is slight (0.64 per cent).

In some experiments with the Marot honey-comb sorter, M. Zacharewicz obtained the following results, after adjusting the apparatus in such a way as to obtain the best work.

In these experiments, carried out without a turbine, and with an agricultural type of sorter, the increase in weight per unit of volume of the seed-wheat due to sorting varied from 1.3 to 5.3 per cent according to the original weight of the grain.

—	Weight of bushel		Proportion	
	Before sort- ing	Seed wheat	Before sort- ing	Seed wheat
	lbs.	lbs.		
Local wheat (Deux Sevres): 1st lot..	59.7	62.9	100	105.3
Local wheat (Deux Sevres): 2nd lot..	60.8	61.6	100	101.3
Saumur March wheat (sold for seed).....	60.8	64.0	100	105.2

688.—French Types of Farm Buildings.—

DABAT, L., Report presented on behalf of the Agricultural Committee, on the collaboration of MM. Vignerot and Maitrot in the publication of the "Modeles-types de Constructions Agricoles" of the Ministry of Agriculture, in the *Bulletin de la Societe d'Encouragement pour l'Industrie Nationale*, Year CXIX, No. 1, pp. 21-24. Paris, Jan.-Feb., 1920.

The French Ministry of Agriculture has published a work entitled "Modeles-types

de Constructions Agricoles" with the object of assisting both farmer and builder in the improvement of rural buildings. The types dealt with result from work carried out in various parts of France by the engineers of the "Corps des Ameliorations agricoles" (which has since become the "Corps du Genie rural") who, by their constant contact with the rural populations, have been able accurately to gauge local needs. The types also take into account the data furnished by projects that gained prizes in competitions opened by the "Service des Ameliorations agricoles" for architects and builders who have specialized in rural buildings.

In deciding on these model types, recourse has been had continuously both to the most recent and practical information furnished by agricultural science and by hygiene, and to the results acquired by experience. The science and experience have been directed not towards the elaboration of entirely new models, but towards the improvement of regional types studied on the spot with their local characteristics derived from the soil, climate, customs, and economic life of each region.

The result is that these regional model types of agricultural buildings represent a combination of the precepts of treatises on agricultural buildings with a monographic documentation and model projects of a concrete character. They are applicable to the most varied kinds of buildings:—Farms, barns, stables, cattle sheds, sheep-folds, houses for farmers and of labourers, co-operative works, etc. Each model type includes an introduction explaining and justifying any general or particular arrangements adopted, as well as the economics of the scheme, general and detailed plans, specifications for the work, a detailed estimate of the cost, a memorandum of such regional prices as could be ascertained easily, and a list of charges and conditions for the undertaking.

Farmers who wish to build or restore farm buildings will find in the work in question all information necessary for choosing the arrangements that are best and most suited to their particular region. Builders, architects, contractors, local workmen will be able to find the characteristics of all types of agricultural buildings as well as the basis for any special work they have to carry out.

The work is published in two forms:—

(1) The work, text and plates, is bound in a royal-quarto album for each part; (2) each project separately with large plates. The complete work comprises 4 parts including 80 model types from all the regions of France; a fifth part will be published later dealing with co-operative factories for dairying, cheese and butter making, distilling, oil extraction and cider making and with co-

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operative warehouses, etc. The work was ready for publication, but the advent of the war delayed it so that preparations for publication could only be begun in 1916.

The first two parts, corresponding with the North and East regions of France, have already appeared and will be of great assistance to those who have the heavy task of reconstructing the villages destroyed during the war. A considerable number of these model types of agricultural buildings has been distributed in the devastated agricultural regions by the Ministry for the Liberated Areas, and agricultural societies and other associations interested in the renaissance and development of agriculture in these regions have been supplied with the documents, which are kept by architects and contractors. In this way, the devastated regions in the North and East of France will be the first to benefit from this interesting and original work of the Ministry of Agriculture and, eventually, the other regions will be able to begin the work of improving rural buildings on sound and methodical lines, whilst avoiding the equally bad extremes of superfluous luxury and misguided economy.

The work of preparing and supervising the publication of the model types of farm buildings was confided in 1916 to M. Vignerot, a technical official of the Ministry of the Liberated Areas, who edited the whole work and gave homogeneity to the varied contributions from his colleagues. As M. Vignerot was sent abroad on a mission in 1918, the work was then placed under the direction of M. Maitrot, who succeeded to M. Vignerot's position in the Ministry. M. Maitrot has mainly been occupied on the diffusion of the model types in the devastated regions, particularly amongst the 1534 co-operative building societies that have been established.

RURAL ECONOMICS

- 788.—**The Value of Fruit Trees.**—I. DELAUNY L., in *La Vie a la Compagne*, Vol. XVI, No. 194, p. 181. Paris, August, 1920.—II. BRETON-BONNARD, L., in *Le Jardin*, Year XXXIII, No. 720, p. 360, Paris, September 20, 1919.—III. LECOLIER, P., in *La Vie Agricole et Rurale*, Year IX, No. 47, pp. 384-386. Paris, November 22, 1919.

AGRICULTURAL INDUSTRIES

- 796.—**The Use of Milk Powder in Bread-Making.**—LINDET, L., in *Comptes rendus de l'Academie d'Agriculture de France*, Vol. VI, No. 18, pp. 465-467. Paris, May 12, 1920.

M. Lindet exhibited milk bread made with desiccated skim-milk. This bread has a

good flavour, and rises very satisfactorily, even when the quality of the flour used leaves much to be desired. The skim-milk powder absorbs as much water as the flour, and this may be replaced, weight by weight, by the milk powder. If 10, 15 or 20 per cent of the latter is added, and the consumer eats the same amount of bread, a saving of 10, 15 or 20 per cent of the flour is effected.

In flours, the proportion of the carbohydrates (starch, sugars, etc.) to the nitrogenous substances is as 100 is to 17 or 18; in skim-milk, the proportion of lactose to casein is as 100 is to 70. In wheat bread with the present flours extracted at 80 per cent, there is from 8 to 9 per cent of nitrogenous substances, while in a bread containing 15 per cent of milk powder, there will be from 15 to 16 per cent.

At the present time, milk powder costs 4.20 fr. per kg. but as milk bread is a luxury article, it finds consumers, even at a high price.

It might be objected that skim milk itself could be used, instead of the milk powder, which would avoid the need for evaporation. This might be done, if the dairy were near the bakery, but skim-milk soon turns acid. It is true that it might be pasteurized or sterilized, but the coal used in these operations and the transport of the water contained in skim-milk, would cost more than the coal needed for desiccating the milk.

In short, M. Lindet believes that the manufacture of milk bread might be encouraged without detriment to the general food supply, and that its use would economize the flour supply. However, he draws attention to the fact that such bread is an article of luxury, and superfluous from the point of strict necessity.

PLANT DISEASES

- 912.—**The Destruction of the Elm by Poison-Gases in War.**—GRAFFIN, R., in *Comptes rendus des seances de l'Academie d'Agriculture de France*, Vol. VI, No. 24, p. 609. Paris, 1920.

The elm has proved extraordinarily susceptible to the injurious effects of poison-gases, more so indeed, than any other forest tree.

In the *massif* of the Argonne chain running from the Valley of the Bar to the Meuse (Vouziers to Senay), there are many dead elms that show no trace of having been struck by missiles, or otherwise injured.

Elms are equally susceptible whether they are growing singly or in a coppice and their age makes no difference.

If a dead tree is found there today in a stand, the probabilities are that it will prove to be an elm, although this corner of Argonne was not bombarded until November, 1918,

and then only for a short time, at the season when the trees had shed their leaves.

601.—**New Studies on *Sorospora Uvella*, a Fungoid Parasite of Noctuidæ in America.**—SPEARE, A. T., in *Journal of Agricultural Research*, Vol. XVIII, No. 8, pp. 399-439. Washington, D.C., Jan. 15, 1920.

Observations mainly of a biological nature on *Sorospora uvella* (Krauss). Gd., a fungus recorded from the eastern United States and from Canada as a parasite of various species of Noctuidæ. The observations are based on the study of artificial cultures of the fungus, on inoculation experiments on various living hosts, and on the histological study of infected insects before and after death.

It is now admitted that the fungus in question should be classed not with the *Entomophthorales*, but with the verticillate Hyphomycetes until its perfect or ascigerous stage is discovered. In fact, the development and structure of the conidiophores of *S. uvella*, and the formation of the conidia are characteristic of the latter group of fungi.

The fructifications of the parasite in question consist of thick-walled resting spores or chlamydospores and thin-walled conidia; the latter have now for the first time been definitely connected with the life cycle of the fungus.

It has been shown that the special, saccharomycetiform vegetative cells present in the blood of infected insects are ontogenetically connected with other phases in the cycle of the fungus. These cells are ingested by some of the white blood-corpuscles (phagocytosis) and this is apparently followed by the destruction of the phagocytes. This phenomenon has been overlooked by those who have studied the fungoid diseases of insects.

The fungus grows quickly on artificial media and shows two entirely different types of development when cultivated on the appropriate medium. In certain cases, whether the fungus is cultivated on artificial media, or whether the chlamydospores are put in damp cells, fruiting structures of the *Isaria* type are produced.

The disease caused by *S. uvella* is rapidly transmitted to healthy insects; in laboratory experiments a mortality varying between 60 and 90 per cent can soon be obtained.

913.—***Bacterium Atrofaciens* N. Sp., Injurious to Wheat in the United States and in Canada.**—McCULLOCH, L., in *Journal of Agricultural Research*, Vol. XVIII, No. 10, pp. 543-552, Washington, D.C., Feb. 16, 1920.

In the course of examination of various collections of wheat of the crops in 1917

and in 1918, a new bacterial wheat disease was discovered in the United States (New York, Michigan, Kansas, Missouri, Minnesota, North Dakota, South Dakota, Oklahoma) and in Alberta, Canada.

This disease affects the leaf, ear, and grain of wheat. On the ears, the glumes show at the base a dull brownish black tinge. Sometimes, this dark area extends over nearly the whole surface of the glume; but usually only the lower third or less is darkened, and often no discolouration is visible on the exterior. Glumes that present a normal colour on the outer surface may have the inner surface discoloured. In every case, dissection of the spikelet reveals more signs of disease on the inner surfaces than on the outer. Often a narrow dark line at the junction of the spikelet and the rachis is the only outward sign of disease. The grain enclosed by diseased glumes shows varying degrees of undevelopment. The fact that the grains are often well filled out seems to indicate that the disease sometimes appears late in the course of growth. In diseased grain the base varies in colour from a scarcely noticeable brown to charcoal black. In the discoloured areas, bacteria are found in great abundance, which have been isolated and pure cultures obtained. The organism in question studied by the author from the point of view of cultural characters is considered to be the cause of the wheat disease in the pre-mentioned regions. It was a hitherto undescribed organism, and it is here designated as *Bacterium atrofaciens*.

Inoculations on young wheat plants have given rise to numerous leaf infections. Fewer mature plants have been available for inoculation of ears and besides this, the weather conditions were somewhat unfavourable. However, enough infections were effected to determine the positive pathogenicity of the organism for glumes and kernels. The organism has also been re-isolated from the glumes and kernels of inoculated ears, and a second series of inoculations effected on the ears and spikelet leaves. Infection was evident also in this second case and it was possible to re-isolate the bacteria once again.

INJURIOUS INSECTS

926.—***Trachelus Tabidus*, Black Grain-Stem Sawfly of Europe, Injurious to Wheat and Other Cereals, Introduced into the United States.**—GAHAN, A. B., in *United States Department of Agriculture, Bulletin* 834 pp. 1-18, bibliography of 56 works, Washington, D.C., May 19, 1920.

During the summer of 1918 it was discovered that another exotic insect liable to cause considerable damage to agriculture,

has become established in America. A complaint was received by the Bureau of Entomology, Washington, D.C., from a correspondent at Gaithersburg (Maryland) regarding the work of certain attacks which had caused serious damage to ripening wheat, and steps were immediately taken to investigate the outbreak with the result that this insect was identified as *Trachelus tabidus* (Fabricius) Jurine; this sawfly belonging to the genus *Cephidae* has already been referred to in European literature (England), and goes by the popular name of "black grain stem sawfly."

In the Old World Continents, the species occurs throughout most of central and southern Europe, south-eastern Asia, and northern Africa.

In America, the insect was found, before 1918, in New Jersey, Virginia, Delaware, Maryland, Pennsylvania and New York.

It is probable that the species has even now spread and is likely to spread over a very wide area of the New Continent just as it did the Old.

Various cereals, especially wheat, but also barley and rye, have been attacked, and the Russian records are more specific and confirm this statement.

In America only wheat and rye have thus far been recorded; it appears certain that wheat is the food plant preferred. It is not improbable that *Tr. tabidus* also attacks plants other than those mentioned.

The author gives the synonymy of the insect, and describes the adult and the hibernating larva, and also makes preliminary observations with reference to the life history of the sawfly.

The larvæ burrow downwards through the stem pith hollowing it out to the base; before preparing to hibernate, this larvæ severs the stem from the inside at or very near the surface of the ground, leaving the epidermis of the straw intact sufficient to allow it to stand erect; the first slight bending of the ripened straw causes it to snap off and fall, having the same effect as a strong wind.

An efficacious chalcidoid parasite of *Tr. tabidus* has been notified in America; reared from a species which has apparently never been described, belonging to the genus *Pleurotropis*.

It is recommended to plough in the stubble containing the larvæ so deeply that the maturing adult will be unable to escape. Wheat, barley and rye should be followed by some crop which will not serve as a host plant, such as maize or market crops.

705.—On the Action of Chloropicrin on the Parasites of Wheat and on Rats.—PIUTTI, A., in the *Comptes rendus des Séances*

de l'Académie des Sciences, First Half-year, 1920, Vol. CLXX, No. 14 (April 6, 1920), pp. 854-856. Paris, 1920.

The author states that recent experiments by M. G. Bertrand and his collaborators (1919-20) on the toxic action of chloropicrin on various animals clearly confirm the experimental results obtained by himself and M. L. Bernardini and published in 1917 and 1918.

Regarding the action of chloropicrin on the parasites of wheat (*Calandra granaria*, *Tenebrioides mauritanicus*, *Lamophilaus ferrugineus*, *Sitotroga cerealella*, *Tinea granella*, *Plodia americana*), it should be observed that the numerous experiments by MM. Piutti and Bernardini, which were always conducted with wheat that was very much damaged, were carried out at first on a small scale under bell-jars, and then on a large scale on tons of wheat stored in a corn mill. All these experiments clearly showed that if chloropicrin acts on wheat for about a week at a strength of 20 cc. per cubic metre of space (whether occupied by wheat or not) at a temperature of about 15-20°C. excellent results are obtained as far as the death of the parasite is concerned. Under these conditions, the parasiticide action of chloropicrin is greater than that of carbon bisulphide, which, if the same results are to be obtained, must be used in far greater quantities and has, moreover, well known disadvantages (inflammability). Other things being equal, it has been shown that a higher temperature greatly assists the parasiticide action of chloropicrin, as this becomes more volatile.

Flour and bread made from wheat treated with chloropicrin was quite harmless and had lost none of its food value. It is remarkable, however, that wheat treated with chloropicrin loses about 30 per cent of its germinating capacity. In M. Bertrand's experiments, the amount of liquid used per cubic metre was about 10 times that employed by M. Piutti and Bernardini; in this case, it can be foreseen (apart from the disadvantages of such high concentrations from the practical point of view) that the germinating capacity of the grain would undergo too violent a destructive action.

Experiments carried out by MM. Piutti and Bernardini in 1917, with the object of testing the use of chloropicrin for freeing ships from rats, were at first made in the laboratory in suitable chambers and afterwards in ships' holds of a capacity of 800 and 1075 cu. m. respectively. When the chloropicrin, placed in a tin on deck was allowed to fall drop by drop into a canvas tube containing cotton-wool, all the rats that had been placed at varying heights in the hold were dead in two and a half hours. These results

were obtained by using only 1.5 kg. of chloropicrin, *i.e.*, 900 cc. of liquid. Experiments by M. Bertrand, with much higher concentrations than those employed by MM. Piutti and Bernardini, confirm the results of these authors and also show that the rat fleas were killed as well as the rats, a result which is of vital importance as regards the transmission of disease.

595.—Action of Chloropicrin on Various Fungi.—MATRUCHOT, L., and SEE, P., in *Comptes rendus des Séances de la Société de Biologie*, Vol. LXXXIII, No. 7, pp. 170-171. Paris, February 21, 1920.

The toxic action of chloropicrin on animals suggested to the authors the idea of trying its action on fungi. They used a closed area in which the air was saturated with toxic vapour. The fungi were left in this air for periods varying between 7 minutes and 8 hours, then withdrawn and immediately replanted to ascertain their vitality. The experiments showed that the most fragile fungi are: *Hypomyces ochracea* (conidia and chlamydospores), killed without fail after 30 minutes; then *Mucor mucedo* (sporangia), *Botrytis cinerea* (conidia), *Sclerotium echinatum* (sclerotia), killed after 3½ hours; then *Nocardia* sp. (arthrospores), *Penicillium* sp. (conidia), *Amblyosporium* sp. (arthrospores), and *Chaetomium bostrychodes* (perithecia), which die after period of contact longer than 5 hours 40 minutes and shorter than 8 hours.

In an atmosphere not saturated with chloropicrin, but containing 10 cgm. per litre of air, all the fungi except *Amblyosporium* sp., were killed in 48 hours, and double the strength killed even that fungus in 42 hours.

The fungi experimented on belonged to very different groups and represented the most varied vegetative or reproductive forms (mycelium, arthrospores, conidia, chlamydospores, sclerotia, perithecia) and it may be concluded from the results that chloropicrin will completely disinfect an enclosure in respect of any fungi it contains. It suffices to employ the toxic vapour at saturation point for 8 hours, or at a smaller concentration during a longer time which, however, is apparently not more than a few days.

821.—Chlorochroa Sayi, Grain Bug Injurious to Wheat and Other Crops in the United States.—CAFFEY, D. J., and BARBER, G. W., in the *Department of Agriculture, Bulletin* 779, pp. 1-35, Washington, D.C., 1919.

Since 1911, *Chlorochroa sayi*, Stal has caused serious damage to wheat and other crops in the inter-mountain and south-western States. The most important damage

is caused by the insect piercing the newly-formed heads of the cereals and feeding on the liquid content, which prevents the formation of the grain or greatly reduces its weight.

The reduction in yield from grain bug attack varies from 10 to 50 per cent of the crops. In extreme cases the entire crop may be destroyed.

The cultivation of large areas formerly devoted to grazing, eliminated the native food plants of the insect and caused it to attack cultivated plants and resulted in an increase of the pest beyond its former abundance.

Wheat, barley, and rye are the cultivated crops most preferred by this bug. The species also feeds on other cereals, and on alfalfa, cotton peas, beans, cabbage, tomato, and lettuce, in addition to many wild native plants.

The first damage was recorded in 1903, and since that time serious attacks have been reported from most of the States west of the Great Plains area.

Weather and the work of parasites generally restrict destructive outbreaks in each locality to periodic intervals of two or three years.

Adults emerge from hibernation in the early spring and deposit eggs on the material composing the hibernating quarters. The resulting nymphs feed upon tender plants growing in their vicinity. Upon reaching maturity the adults migrate to cereal crops and feed upon the developing heads.

There are three distinct generations and sometimes a partial fourth generation annually. About 50 days are required to complete the life cycle of each generation. After midsummer, the numbers of the insects are greatly reduced by an egg parasite, *Telenomus ashmeadi*, and by two species *Gymnosoma fuliginosa* and *Ocypterodes euchenor* which parasitize the adults. Several kinds of predacious enemies contribute to the same result.

Hibernation occurs in the adult stage under weeds and rubbish. No nymphs or eggs survive the winter. Severe winters result in the death of a large number of hibernating adults and constitute one of the most important factors in restricting destructive outbreaks of this species. During normal winters, at least 95 per cent of the adults survive when hibernating in protected places.

The most effective and practical method of control is the destruction of the adults while concentrated in their winter quarters. This is best accomplished by turning under or burning all rubbish and weeds (particularly Russian thistle, *Salsola Tragus*) in and about cultivated fields.

Trap crops, hand picking and hopper-doers might prove practical in the control of the insect under special conditions.

603.—*Bruchus rufimanus*, A Beetle Injurious to Beans in California.—CAMPBELL, R. E., in the *U. S. Dept. of Agric., Bulletin* 807, pp. 1-22, Washington, D.C., January 27, 1920.

Of late, bean growing, in California has been seriously affected by the presence of the bean weevil (*Bruchus rufimanus* Boh.).

Although this beetle was recorded for the first time in the United States in 1909, it has probably been present there since 1888. Wherever beans are grown in California, the beetle has been found; it not only decreases the value of the product, but it has even led the farmers to reduce considerably the area devoted to the crop.

B. rufimanus has one generation a year and does not develop in dried beans. The egg stage lasts 9 to 18 days, the larval stage 10 to 15 weeks and the pupal stage 7 to 16 days; the adult lives from 1 to 8 months. The eggs are laid on the green pods in the fields from the middle of March to the middle of May; the larvæ are full-grown by August and September and the adults can be found from August to the June of the following year.

The damage caused by the bean weevil is mainly due to the fact that the larva

feeds and becomes the perfect insect inside the seeds. Many adults remain in the seeds for several months, thus rendering them unfit for food, but other adults leave the seeds as soon as they have passed the pupal stage, leaving round holes in the seeds at the place where the larvæ have fed on the tissues. The appearance of these seeds decreases their chance of sale, and, moreover, the seeds are not only lighter but have a reduced germinating power. The germination power of infested beans is 20 to 40 per cent less than that of healthy ones. The germination of seeds one year old or more is only slightly less than that of new seed.

In America, there are no natural enemies of the beetle that provide an efficacious and sure control.

Exposure to a temperature of 77-82°C. for over 90 minutes kills all the beetles present in the seeds. Fumigation with sulphur is not an efficient method of control. Carbon disulphide in the proportion of 112 gm. per cu. metre in a hermetically closed receptacle, causes the death of all the *B. rufimanus* in the seeds. It has been found that, in seeds kept for two years, all the beetles were dead. Seeds from late crops (after March 1) are much less attacked than those from early crops (November to March.)

AGRICULTURAL STATISTICS

THE WHEAT CROP OF 1921

In an article in the "Agricultural Gazette" for September-October a review of the cereal situation was given. This review included, at page 592 of the "Gazette", a table giving the production of wheat in different countries. Since the date of publication of that article official estimates have been received for the first time this year for a number of countries, especially in the southern hemisphere, for which estimates based on acreage and condition figures have had to be made.

The latest figures show an increase in the production of wheat in Europe over the

estimates previously made. The most notable increase is in France which is now producing on practically a pre-war basis. The total crop of Europe is now estimated as 217,000,000 bushels greater than last year.

The world's total is given as 97,000,000 bushels more than in 1920. It must always be remembered, however, that Russia, which produced such large crops in pre-war days, is not now taken into consideration.

THE AGRICULTURAL GAZETTE OF CANADA

Countries	1921	1920	Pre-war average 1909-13
	Bushels	Bushels	Bushels
<i>Europe—</i>			
Germany.....	97,848,000	82,859,000	(b) 113,100,000
Austria.....	(a) 6,900,000	5,494,000	(b) 5,422,000
Belgium.....	11,523,000	10,275,000	14,894,000
Bulgaria.....	42,510,000	39,705,000	(b) 29,308,000
Denmark.....	(a) 7,000,000	6,945,000	5,344,000
Spain.....	143,205,000	138,606,000	130,447,000
Jugo-Slavia.....	(a) 78,000,000	64,712,000	
Finland.....	276,000	272,000	251,000
France.....	315,639,000	230,406,000	317,639,000
Alsace-Lorraine.....	7,132,000	5,907,000	3,763,000
Great Britain and Ireland.....	57,000,000	56,898,000	59,640,000
Greece.....	11,170,000	12,194,000	(b) 9,400,000
Hungary.....	44,700,000	38,295,000	
Italy.....	188,128,000	141,338,000	183,336,000
Luxemburg.....	(a) 500,000	449,000	615,000
Norway.....	(a) 500,000	1,035,000	306,000
Netherlands.....	7,523,000	6,677,000	4,896,000
Poland.....	34,837,000	18,258,000	
Portugal.....	(a) 7,000,000	7,140,000	7,440,000
Roumania (old Kingdom).....	33,000,000	24,000,000	87,792,000
Sweden.....	11,019,000	10,528,000	8,103,000
Switzerland.....	3,800,000	3,586,000	3,314,000
Czecho-Slovakia.....	40,000,000	26,167,000	23,541,000
Total Europe.....	1,149,210,000	931,746,000	(c) 1,008,551,000
<i>North America—</i>			
Canada.....	294,388,000	263,189,000	197,118,000
United States.....	740,655,000	787,128,000	686,697,000
Total North America.....	1,035,043,000	1,050,317,000	883,815,000
<i>Asia—</i>			
India.....	250,468,000	377,887,000	359,035,000
Japan.....	27,874,000	28,288,000	24,166,000
Total Asia.....	278,342,000	406,175,000	383,201,000
<i>Africa—</i>			
Algeria.....	41,480,000	8,561,000	34,998,000
Egypt.....	37,010,000	31,711,000	34,121,000
Morocco.....	20,040,000	22,000,000	(b) 18,202,000
Tunis.....	9,921,000	5,225,000	6,250,000
South Africa.....	(a) 8,000,000	8,113,000	6,520,000
Total Africa.....	116,451,000	75,610,000	100,071,000
<i>South America—</i>			
Argentina.....	(a) 175,000,000	184,930,000	148,908,000
Chile.....	(a) 27,000,000	25,180,000	14,000,000
Uruguay.....	(a) 10,000,000	10,321,000	6,519,000
Total South America.....	212,000,000	220,431,000	169,427,000
<i>Australasia—</i>			
Australia.....	137,000,000	146,795,000	90,500,000
New Zealand.....	(a) 6,000,000	6,674,000	7,070,000
Total Australasia.....	143,000,000	153,469,000	97,570,000
World's Total.....	2,934,046,000	2,837,748,000	(c) 2,642,635,000

(a) Estimates based on condition and acreage.

(b) Average 1915-19.

(c) Less Jugo-Slavia, Hungary and Poland.

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EUROPEAN CROPS OTHER THAN WHEAT

The total production of rye in Europe, including Germany, Belgium, Bulgaria, Spain, Finland, France, Alsace-Lorraine, Greece, Hungary, Italy, Netherlands, Poland, Sweden and Switzerland, is 571,907,000 bushels against 436,335,000 last year. The large increase is due almost entirely to Germany and Poland.

The production of barley in Germany, Belgium, Bulgaria, Spain, Finland, Greece, Hungary, Italy, Netherlands, Poland, Sweden and Switzerland, is 301,838,000 bushels against 285,652,000 last year.

The production of oats in Germany, Belgium, Bulgaria, Spain, Finland, Alsace-Lorraine, Greece, Hungary, Italy, Netherlands, Poland and Switzerland is 678,823,000 bushels against 668,773,000 last year.

The production of potatoes in Belgium, Bulgaria, Spain, Finland, Alsace-Lorraine, Hungary, Netherlands and Switzerland, is 400,626,000 bushels against 442,750,000 last year.

The production of corn in Bulgaria, Spain, Greece and Hungary is 95,175,000 bushels compared with 121,410,000 in 1920.

UNITED STATES OCTOBER CROP REPORT

Crops	1921	1920	Average 1915 to 1919
	Bushels	Bushels	Bushels
Wheat.....	740,655,000	787,128,000	830,896,000
Rye.....	64,332,000	69,318,000	69,159,000
Barley.....	163,399,000	202,024,000	208,098,000
Oats.....	1,078,519,000	1,526,055,000	1,432,697,000
Corn.....	3,163,063,000	3,232,367,000	2,797,625,000
Flaxseed.....	8,878,000	10,990,000	11,704,000
Potatoes.....	345,844,000	428,368,000	371,283,000
Hay.....	94,619,000	108,233,000	103,397,000

UNITED STATES WHEAT SUPPLY SITUATION ON OCT. 1

	This Year	Last Year
Farm carry-over July 1.....	54,000,000	48,000,000
Crop.....	741,000,000	787,000,000
Total supply.....	785,000,000	835,000,000
Marketed to October 1st.....	377,000,000	287,000,000
Balance on farm.....	418,000,000	548,000,000
Farm seed and feed.....	100,000,000	101,000,000
Balance left on farm net.....	318,000,000	447,000,000
The supplies on October 1 are distributed as follows:		
On farms, net.....	318,000,000	447,000,000
Country mill and elevator stock.....	152,000,000	129,000,000
Visible supply.....	59,000,000	29,000,000
Total on hand.....	529,000,000	605,000,000

This statement shows that there are 76,000,000 bushels less wheat in the country than last year.

THE WHEAT SITUATION

(From Broomhall's Corn Trade News, Oct. 11, 1921)

The decline of values in America has undoubtedly been a great disappointment to many traders on the other side of the Atlantic, and we cannot doubt that severe losses have been sustained. In the case of one prominent firm fresh arrangements for dealing with open contracts were deemed necessary,

but all liabilities were met. In this country there have also been severe losses and some minor failures. The real root of the present difficulties appears to be the general determination of growers alike in North America and Europe to market their wheat at the earliest moment possible; it is naturally

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expected that many will want to sell immediately after harvest, but it is now some time since the harvests were gathered and still the tide flows strongly, although we are assured by the "Modern Miller", of Chicago, that the soft wheat States have shipped practically all their surplus, whilst supplies in some parts of the hard winter region are low. It goes without saying that if the foregoing statement is founded on solid facts, the expected sharp decrease in the U.S. crop movement must come at an early date, but in the meantime, as already said, people on this side of the Atlantic may well feel somewhat sceptical as to the correctness of U.S. statistics of supplies. We await further developments in the U.S.A. and Canada, but may point out that on present information no one can entertain reasonable doubt that these producers will furnish, during the current season, the full quantity (400,000,000 bushels) with which we have credited them.

Turning to exporting countries other than North America, we have to report that all seems to be going well with the new crops and the outlook for these supplies remains distinctly hopeful. In about five weeks from now both Argentina and Australia will be starting the harvest of the new crop, and the question naturally arises—will Argentine and Australian farmers also rush their new crop of wheat to market as the winter wheat farmers of the States did and as the spring-wheat farmers of the U.S.A. and Canada are doing? Argentina has made further drastic price reductions, but we hardly expect a large part of the balance of the last crop will be shipped between now and Christmas. Manchurian offers too, seem somewhat of a mystery; if the country possesses the surplus so confidently reported why do we not find liberal quantities now on offer on our markets?

Importing countries, with the exception of France, are taking foreign wheat about as we expected; however, the season is very young yet, so the figures at present available have not much value as indications. Taking a general survey we can report that we are not inclined to increase our preliminary

estimate for any country; with reference to the lack of demand for foreign wheat in France, it may be stated that French people prior to the war were quite accustomed to eat bread made from their native wheat only, and we have heard it praised very much by our own countrymen. One fact emerges from recent reports from France, namely, that the taste for rye bread is notably lacking, and this fact can be expected to increase the wheat consumption.

To sum up the position, there is no certain evidence that the statistics of wheat supplies and requirements have gone badly astray anywhere, although the heavy deliveries of American farmers have caused some doubts with respect to the available supplies in that quarter. The quantities as we reckon them undoubtedly show a surplus after providing for all likely requirements, including a fair quantity for Russia. It is a well known fact that the markets usually look very weak when prices have about touched bottom, but we cannot but think that there must be further weakness if growers, either in North America or elsewhere, continue to force large quantities on markets which are already well supplied, and probably the weakness will still be experienced, even if a large part of the trade in America are firmly convinced that their country will have shipped out practically all its available surplus at a comparatively early date.

We alluded last week to the schemes which are before the country with the object of improving commerce, and these matters are being kept well to the front in the political world. It is generally assumed that the Government are about to take some steps to reorganize international trading, and this should not be entirely left out of grain operatives' calculations, for it is within the bounds of possibility that some measures may be devised to improve "exchange" and thus increase the purchasing power of continental nations. Moreover, it must not be forgotten that prices now are about half of what they were not very long ago, consequently the demand generally should be larger, whilst at the same time selling pressure from producers should be less.

SOUTH AFRICA

Classification	1920	1921	Increase (+) or decrease (—)	
			In number	Percentage
Horses.....	690,124	695,138	— 5,014	— 0.7
Asses.....	523,550	498,616	+ 24,934	+ 5.0
Cattle.....	5,974,802	5,575,488	+ 399,314	+ 7.2
Sheep.....	26,288,960	26,491,500	— 2,202,540	— 7.7
Goats.....	4,895,080	5,842,270	— 947,190	— 16.2
Swine.....	560,155	724,007	— 163,852	— 22.6
Ostriches.....	283,980	282,070	+ 1,910	+ 0.7

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MADAGASCAR

Classification	1920	1916	Increase (+) or decrease (-)	
			In number	Percentage
Cattle.....	7,518,657	6,588,064	+ 930,593	+ 14.1
Sheep.....	300,000	308,751	- 8,751	- 2.8
Swine.....	1,000,000	543,585	+ 456,415	+ 84.0

ENGLAND AND WALES

Classification	4 June, 1921	4 June, 1920	Increase (+) or decrease (-)	
			In number	Per centage
Horses.....	1,384,400	1,365,700	+ 18,700	+ 1.4
Cattle.....	5,515,600	5,546,800	- 31,200	- 0.6
Sheep.....	13,806,200	13,382,700	+ 423,500	+ 3.2
Swine.....	2,505,700	1,993,900	+ 511,800	+ 25.7

LATEST CROP REPORT

A cablegram received from the International Institute of Agriculture on October 24th gives the following summary of the world's crops:

The production data for cereals for 1921 previously communicated is practically unchanged. The production of potatoes and sugar beets is generally below last year's. The production of wine for 1921 in Italy is 7,259 million gallons or a percentage as

compared with 1920 of 78.0. Egyptian cotton is reported 1,662 thousand metric tons, a percentage of 61.3 of previous year. The sowing of cereals is being impeded through drought in Germany, Belgium, Italy, Czechoslovakia, but is proceeding actively in France, and Roumania. Conditions in United States and India are favourable.

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